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# *ORIGINAL ARTICLES*

## PRESIDENT'S ADDRESS BEFORE THE AMERICAN SOCIETY OF ORTHODONTISTS*

BY RALPH WALDRON, D.D.S., F.A.C.D., NEWARK, N. J.

IT is not my purpose to burden you with a lengthy address, but I will confine myself to just a few introductory remarks, which I deem you will not misunderstand.

If I were more eloquent I should have tried to thank you in more appropriate terms than I shall probably be able to express for the honor you have conferred upon me, in electing me your President for the year 1923-1924.

Still it would be improper, if not most ungrateful, were I not to express the thanks I feel for the honor you have so kindly bestowed upon me; nor will I say it was not undesired or unhoped for, because the history of this society has shown that you have always honored those who have done the work assigned to them, and this thought I hope will be ever present in the minds of those whose good fortune it is to attain membership in the American Society of Orthodontists. It certainly is an honor worth striving for and I sincerely trust you will appreciate my thanks, as I your good will.

The American Society of Orthodontists is a scientific body of professional men organized for the further study and advancement of the science and art of orthodontics. This science must therefore comprehend the knowledge, and the evolution of the knowledge of the biology of man, as manifested in the dental and maxillary arches and particularly in the osseous tissue composing the latter, no matter whether it deals with a so-called normal condition, or with its modification known as disease or deformity.

*Read before the American Society of Orthodontists, Kansas City, Mo., March 18-21, 1924.

The aim and object of all science is to be utilized and to be useful in the interest of mankind, and here is where the scientific theorist and the practical orthodontist must meet on common ground. For all science as it is human in its origin is raised above the level of mere theory by the service it renders to humanity; then it must necessarily follow—the greater the service, the greater the science.

If the aim and object of orthodontia is, as I believe it to be, "To make growth more perfect, decay less rapid, form more beautiful, living more enjoyable, life more vigorous, and death more remote," then the biologist and the skilled technician must not only meet on common ground but be so correlated that suffering humanity will be the gainer thereby; for science is but classified knowledge, and if it cannot be applied in the interest of mankind, it is but speculative, and not worthy of being classified as science. Therefore to overstress one branch of our science, at the expense of another, is not only unwise but a grave error, for as yet I do not know of any other dependable stimulus used by successful orthodontists in the development of the dental and maxillary arches than a mechanical stimulus, which has its inception in splendid technic, and I am sure you will agree with me that the more perfect the technic, the better the stimulus, other considerations being equal.

I would not like to be misunderstood, in that sentence regarding dependable stimulus, for there are other stimuli which are very valuable as an adjunct to the mechanical stimulus already mentioned. The functional stimulus through exercise as used by Dr. A. P. Rogers, must not be treated too lightly for I am sure it is of no small importance, and I congratulate Dr. Rogers upon his earnest devotion to orthodontics and for the sacrifice of time and energy spent in bringing about this useful adjunct as an aid in the correction of malocclusion of the teeth.

A system of therapeutics which employs the extracts of the ductless glands as curative agents, has developed in the last few years, and in a short time it has acquired a large and enthusiastic body of advocates among which number many of our orthodontists. There can be no criticism of this, provided there is rational evidence for believing that the condition for which aid is sought is dependent upon some interference with the action of the endocrine glands, and provided also that there are just grounds for believing that extracts of the glands in question are active and that they control, or partially control either growth or development or both. Irrational imagination has led many to stray far from the truth, and employ these agents in mere speculation and to raise false hopes in their patients, and possibly do untold harm by the use of that about which they themselves know but little.

To say that lack of bone growth is due to functional deficiency in the whole or part of the pituitary gland is to the writer with his limited knowledge, merely speculation.

In the first place it is necessary to determine the evidence that leads to such a conclusion that a gland is functionally deficient in whole or in part. The most common means of furnishing such evidence has been to remove a

gland in part or *in toto*, and here the skill of the operator and his technic are very important factors which, if not taken into consideration, might be very misleading, for, with the improved present-day technic, mortalities due to gland removals are less numerous than formerly and previous statistics on this subject must therefore be unreliable and of little use as data in this present day.

Quoting from Dr. J. Howland of Johns Hopkins, "There can be no doubt that disease or injury to the pituitary or to the region of the brain in its immediate neighborhood causes at times most conspicuous physical alterations. Acromegaly and dystrophia adiposa genitalis have been correlated so often with tumors of the pituary gland that matters seem relatively plain, but recently, new observations to confuse and vex us have been made. Three groups of experimenters in the last few years have succeeded in removing this gland *in toto* from dogs, with no disturbance of the health of the animals other than that entailed by the surgical procedure. The dogs have grown as well as their control animals and have shown no tendency to deposit fat."

With this evidence it seems rational that we should not, with our limited knowledge, lay all blame for lack of bone growth at the door of the pituitary, but search along another line of endeavor, for instance along that path already trodden by the pediatrician.

It would be well to pause here for a moment and digress from our subject in order that we may be agreed on the meaning of growth and development, for there are many who treat these words synonymously, as is evidenced by our orthodontic literature of the present day.

By normal growth we mean: "The augmentation of the body, by addition to the number of cellular elements, without the production of structural abnormality or differentiation into unlike tissue." Another authority defines it as: "An increase in the volume of living material, and that it consists of a constant increment in the body substance until the adult condition is reached." Biologic development may be said to mean: "That sequence of organic changes by which the fertilized ovum of a plant or animal arrives at maturity."

By these definitions it can easily be seen that one considers size and shape while the other takes into consideration function for necessary and specific purposes.

There was a time, and it was not in the far-distant past, when we were taught that bone could be grown in direct proportion to the skill of the operator, and the efficiency of the appliance, but numerous failures have convinced us otherwise and as we develop in the orthodontic knowledge we realize more and more that we are dealing with a biologic problem, containing many unseen and unknown forces, and that only by research and an exchange of ideas with those of correlated sciences can we hope to master this gigantic problem.

Economic conditions seem to render orthodontic research work most difficult, and it is to be regretted that the universities and the foundations have not given us more assistance in the past; but we have a small group

within our society who have carried on research work, and who have had to bear the financial burden, which is ofttimes hard to bear, as well as the mental and physical burden, in order that we may progress, and their only reward has been the knowledge that they have done something for humanity.

Not everyone can be a genius; nor is everyone able to carry on research work, for there are few such men in any society. Average intellect is what most of us have to be satisfied with and beyond the gifts of Nature we cannot possibly go, neither we nor the members of any other profession, but there is one thing which we can always do, and that is to make a generous contribution in a financial way that this small group of research workers in our midst will be stimulated to greater achievements in the future by our cooperation in bearing the financial burden of such research. Therefore I urge the society to donate seven hundred and fifty dollars for research work during the coming year, to be spent as the Executive Committee may deem most prudent.

A large percentage of our cases for which aid is sought is evidenced by this lack of growth and development, and numerous authorities tell us that more can be achieved through a dietary reform than through any other agency.

The work of Mrs. May Mellanby, Pickerill, McClendon, McCollum and many others seem to point out that in the prevention of caries, as well as malocclusion of the teeth, probably the most effective measure is to adopt a policy which will result in the formation of a dental mechanism possessing its own barriers of defense, and the most logical procedure seems to be in the establishment of a better skeletal and dental apparatus by means of a scientific dietary reform.

Anthropologic studies seem to sustain these authorities in the above claim, and according to Stephanson: "The teeth of the primitive Eskimo were excellent, while the teeth of the younger generation of Eskimos dwelling along the arctic coast of Alaska have teeth as defective as those of children in the States, due to their modified diet of flour, molasses, sugar, muscle meats, etc., which is totally different from the diet of their forefathers."

If these authorities are correct, and I have every reason to believe they are, our problem then begins with the expectant mother, and continues until dentition is completed.

For further study along these lines, I have been offered the assistance of the Department of Child Hygiene of the State of New Jersey, which has twenty-five thousand children under its care and supervision, and the director of this department has signified his willingness to cooperate with a committee from this society so that our problems will be better understood and these children benefited thereby.

This Society is composed of a select body of persons whose education, in at least most subjects, must be considered equal or nearly so, and yet in discussion we do not all use the same terminology, which at times is very per-

plexing. We have a committee on nomenclature which renders an annual report and ofttimes the society votes to accept the recommendation of this committee to adopt a certain terminology, but the individual member still insists on using his own terminology while presenting papers and while taking part in discussions before the society. This is to be deplored and means that the committee on terminology is in need of revision, or its reports should be more carefully considered before the society adopts them, or there are wilful members who hold their own opinions as paramount to those of the society.

This is not alone inherent to this society, but exists in the American Dental Association, and I believe that it is at times justifiable. The only remedy as far as I can see, is to have an able representative of the orthodontic committee on terminology of this society, appointed as a member of the committee on terminology of the American Dental Association, in order that the terminology relative to orthodontia will be acceptable to us, as certain terminology recently adopted by the National Dental Association is by no means acceptable to us as orthodontists. I would advise the American Society of Orthodontists to petition the proper authority for a representation on that committee, in order that our terminology may be more correct, and may better suit our needs.

Last year our meeting was marred, and the greater part of the afternoon of the second day was wasted by useless discussion concerning certain changes relative to our Constitution and By-Laws, which had been revised only one year previously. (April 25, 1922.)

The Constitution and By-Laws contain less than two thousand words and can be read in less than ten minutes, and cover all points raised by those who favored its revision, and which I think is absolutely unnecessary at this time.

I fully realize the lofty ideals of our former president when he recommended those three amendments to our Constitution at the meeting last year. I know of no man for whom I have a greater regard, and I fully agree with him that we should maintain our self-respect and no longer accept that "honorarium" of a bound copy of our proceedings for each and every member of this society as the price for the rights to publish our proceedings.

I maintain that it is beneath our dignity to accept for this society that which we would personally deem unprofessional, and I would therefore recommend that the Board of Censors make an arrangement with the publishers of our proceedings to print and bind enough copies of our proceedings each year that each and every member may have a copy of the same, and that fifty extra copies be deposited with the secretary to be distributed by him to the various libraries and to others who may desire such, and the expense of the same to be met by an assessment as stated in Article 2, Section 2, of our By-Laws, which reads as follows, "An annual assessment to meet the incidental expenses may be levied."

We now have two hundred and eight active members in this society.

This means that we receive two thousand and eighty dollars annually from dues, which I think is sufficient for our present needs. This amount will also allow us to make a generous contribution toward any research work we deem advisable without depleting our treasury or altering our Constitution and By-Laws, which necessarily wastes valuable time at our meetings which can be spent in a more profitable way. Therefore I would suggest that the Constitution and By-Laws be not changed until it is absolutely necessary to do so.

I am indeed sorry to have to remind the society that we have not received a bound copy of the transactions of this society since 1921, and I sincerely hope and trust the Board of Censors will look into this matter, in order that such valuable material will not be lost.

It would be most ungrateful of me if I did not thank the essayists, the clinicians, and all who have worked so faithfully in order that we may have such a wonderful meeting as this gives promise of being; and I most heartily approve of the continuation of the Interrelations Committees, that they may function throughout the year, and be ever on the alert for such material as will furnish enlightenment for the benefit of this society, and in the interest of orthodontia, the ramifications of which seem to have no end in the collateral sciences.

To the Board of Censors I offer my sincere thanks for their support and untiring efforts in the work assigned them and particularly to the chairman whose untiring efforts and unselfish devotion in the interest of this society can never be excelled.

During the past year we have lost by death one of our honorary members, Dr. Calvin S. Case. In the demise of Dr. Case, this Society, the orthodontic profession, and the dental profession in general have sustained the loss of a member who, by the interest he always manifested in the advancement of orthodontic science and technic, contributed in no small degree to their prosperity. By his unselfish expenditure of time and money, in the interest of those whose ill fortune it was to be in need of such service, he did much for the relief of suffering humanity and we owe to his memory a debt of gratitude which cannot be estimated. His genial disposition, his love for light and truth and his earnest devotion to his chosen profession should ever serve as a model for imitation by all who seek advancement, either morally or professionally. Let me urge you who have never studied his book on "Dento Facial Deformities" to do so, for therein you will find some of the fundamental truths he offered to us many years ago and which we are only now beginning to appreciate and enjoy.

Therefore let us not mourn his loss, but be thankful that he lived, and rest assured his influence will never die, and we should rejoice in the fact that we presented him with bouquets, in recognition of his service to us and to all mankind, while he still lived to enjoy them, and he departed this life knowing that he was at last understood, appreciated and loved by the American Society of Orthodontists, and that, that love he reciprocated.

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DISCUSSION

*Dr. Burt Abell.*—Dr. Eby's letter of recent date requesting me to open the discussion of Dr. Waldron's address, has left me in somewhat of a quandary. His argument was that it was the consensus of opinion of the Board of Censors that it should be an established practice of the society to ask the past president to open the discussion of the new president's paper before it was referred to a special committee. In their opinion it seems that the past president has had the opportunity of studying the society and its general conditions, during his own administration. I doubt not that it is their hope that he will be able to connect up the two administrations in your minds.

I want to thank Dr. Waldron for sending me his paper ten days before the meeting as he had promised, but I would expect it of him because you all know he is just the kind of a man, who when he has a duty to do, always does it.

I have carefully read the paper over a number of times and it would be superfluous for me to waste any compliments, much as he deserves them. My effort will be to lay the points covered before you, viewed from another angle perhaps, than the one he takes, without introducing anything foreign to his subjects.

Dr. Eby was right in believing that last year I did discover many things because of my office and as Dr. Waldron, seeming to feel that the matter of research and the printing of our records like, "Banquo's Ghost," would not down, has devoted much space to these subjects, I am freer to accept this invitation.

At the beginning, I would like to quote from his paper, one of the finest things I have ever seen, defining the object of our profession: "The object of orthodontia is to make growth more perfect, decay less rapid, form more beautiful, living more enjoyable, life more vigorous and death more remote." What can you add to that? This being the heart of his paper, he proceeds to treat the matter along two lines; one factor involved is that of mechanical stimuli, and he intimates in a very kind way that this, today, is the chief dependence of the operators, but that this often fails because of the lack of knowledge of the second factor which he has been pleased to name the biologic.

If I understand him correctly, this aspect of the matter has been considered by but few and has been approached along the line by certain theories which he feels must be tested and the faults eliminated, and the truth made available for the use of us all. He has been pleased to discuss this matter along two lines, diet and endocrinology. He has asked us as a Society, to finance these few investigators to the extent of $750.00 to be paid out of the treasury, believing that our regular dues would cover our incidental expenses and this also.

I am glad indeed that he has again taken up the matter of the bound copies of our proceedings. Do you remember that he has asked for an arrangement by our Board of Censors, that the publishers of our proceedings print and bind 258 of these and that an assessment be made under Article 2, Section 2 of our By-laws, and that this be done without marring this year's program by any discussion as to changes in our Constitution and By-laws to cover this in any other way?

May I call your attention also to his statement concerning the reports of our committee on nomenclature? As far as I have been able to find in the records of the Society, the last report made was at the Excelsior Springs Meeting in 1917. I am very glad he is checking up on us in regard to our use of terms in orthodontia, but it is hard to teach some of us old dogs new tricks. I doubt whether there is any excuse for you younger men. Last year Dr. Lischer, the chairman of that committee, stated that he hoped to have a report this year.

It is sufficient to say, we all concur most heartily in Dr. Waldron's eulogy of Dr. Case.

In this epitome, may I say that it is the most thankless task for any president to bring before a society any program for the betterment of the society which involves any decided radical changes. The human mind is so constituted that this must be so, but you have often seen a sign on a door "Keep Out—this means *You!*" Now the sign that Dr. Waldron has attached to this address is "Step In—this means *You!*" If I get his thought, it is this:—that we must have the research. The men who do this work must be supported fully by ourselves. Then, reading between the lines I believe he means to say that we should have the reports from research workers, logically, in the form of papers before our society; that these papers should go down in permanent form in our proceedings and should be available for reference and study at the earliest possible date.

Characteristically Dr. Waldron with his natural bent for "getting a job done," has suggested a shorter, and he thinks easier way than was placed before you last year. I feel that knowing what I do about the experiences of last year and what was proposed to you, that I must hold up before you two alternatives. It would be discourteous to him to inject here my own ideas, so I can simply place before you some of the difficulties that I see are surely ahead in his program, which I will also say, I hope you will adopt, because if you do, we will be farther in advance on the road to self-respecting achievement in certain respects than we have ever been before. He has held up before you this year as I did last year, the high ideals of making as ethical as possible, the conduct of our society and the printing of our proceedings. He differs only in the method.

A telegram from Dr. Ellis, our treasurer, states that our accumulated surplus at present is about $2,000.00 which will amply take care of the cost of the meeting, which in previous years has been something like $1,200.00 to $1,500.00 and also provide for the $750.00 for research work for which Dr. Waldron asks.

I happen to know that if we do not accept "the honorarium" from the publishing company and decide to meet the full expense of printing our proceedings, our assessment will be close to $10.00 a member. Our dues are $10.00 a year, making in all about $20.00. These figures may vary somewhat and be subject to revision. The matter I want to put up to you is whether you will be better pleased to provide your funds this way than by fixing the dues, as was suggested last year, at a figure but slightly above this, which would cover expenses of the meeting, printing of the proceedings, and as large a fund as has been asked for this year for research work. You will have to decide whether you will feel that wisdom died with the revisers of our Constitution, or whether, in view of the facts, you prefer to know the basis from which to make your budget.

Another item which I must hold before you is this:—The Board of Censors have about all they can manage now without editing our proceedings. Do you want to engage the services of someone to edit these proceedings, who is also interested in a *commercial* way in publishing the Journal of Orthodontia providing that Journal is granted the right to run in its pages the papers which have been presented before you in the society program? In recent years, at least, this has been the condition of affairs.

You will have to decide as to whether it is too much to expect of human nature to sacrifice his business interests and the use of our material for his Journal, to speed in making and mailing us our bound copies.

I quote you from Dr. Waldron's paper—"I am indeed sorry to have to remind the society that we have not received a bound copy of the transactions of this society since 1921, and I sincerely hope and trust the Board of Censors will look into this matter in order that such valuable material will not be lost." Allow me to quote also from a letter from Dr. Dewey dated January 12, 1924: "I am in receipt of a letter from Dr. Eby, requesting me to give you some information relative to the publishing of the 1922 proceedings of the American Society.—I have just edited the galley proof of Dr. ———'s paper, which did not reach me until late in December. It was this which delayed the 1922 volume, but I have suggested to the publishers that they publish Dr. ———'s paper in the bound volume before it is published in the INTERNATIONAL JOURNAL OF ORTHODONTIA, in order to get the volumes to the men." What can this last sentence mean except the revelation of the

intent of the publishers to publish in the INTERNATIONAL JOURNAL OF ORTHODONTIA first the material that later is to go into the bound volumes? May I quote from this same letter—"A large amount of the 1923 material has already been published and with the publishing of a few more case reports the 1923 volumes should make their appearance shortly after the 1922 volumes." Dr. Dewey does not state what he means by this material having already been published, but inasmuch as the volumes are not out we take it for granted that he has reference to the INTERNATIONAL JOURNAL OF ORTHODONTIA as the medium through which this publishing was done, neither can he or the publisher be blamed for doing this. With them it must be purely a business proposition. For fresh material for the Journal, they spend from $1500.00 to $2000.00 on our printing and it is not to be supposed they would do otherwise than try at least to get first chance at the papers.

I am giving you this data for what it is worth, for your consideration.

Perhaps your memory of what is read before the society is sufficient so that you do not value as highly as some of us do, access to the printed report. May I say again, I hope you will adopt Dr. Waldron's proposition to print these proceedings ourselves and pay the price raised by assessment, rather than to do as you did last year and absolutely tie the hands of your Board of Censors for funds, not alone by your vote, but by your attitude toward the whole proposition, so they had no recourse except to continue the old régime; the result of which is delay upon delay, until when the report does get to us, it is more or less stale.

Dr. Waldron expresses the wish that the Board of Censors will look into the matter of the delay in our printing. Under the present plan "look into" is just about all they can do. We elect a Board of Censors, ask them to conduct our affairs in a businesslike way, furnish them fifty per cent money enough to do it, and compel them to sacrifice their professional ideals to meet our requirements. Why all this discussion about our printing and the disposal of our papers?—Just this. The whole matter is on a wrong basis and is a plague spot on our otherwise clean record. Men present their papers and reports before us freely and cheerfully. We take them as our own and to get them in permanent form, compel our Board of Censors to literally trade them off—make a deal for a "mess of pottage." The fact that it takes so long that it gets stale, is but the smallest of the considerations for a change in our régime.

Now let us for the first time in the history of this grand old American Society of Orthodontists, give our Board all they need to put our affairs on a business basis, go into the open market for our printing, appoint an editor responsible only to ourselves, instruct them to donate our papers where they will do the most good to the greatest number and *clean up the slate.*

# "THOUGHTS"

## ADDRESS TO GRADUATING CLASS OF THE INTERNATIONAL POST-GRADUATE SCHOOL OF ORTHODONTIA, KANSAS CITY, MO.

By Wm. L. Shearer, B.A., M.D., D.D.S., F.A.C.S., Omaha, Nebr.

GENTLEMEN of the Graduating Class: On behalf of the International Post-Graduate School of Orthodontia, I greet you and congratulate you upon completing the course of study which admits you to membership in a professional body that is doing much for the welfare of humanity.

For many years, leaders in the dental and medical professions have recognized, in a general way, that the teeth have much to do with the welfare and health of the individual, but only during comparatively recent years has the science of orthodontia, named from the two Greek words meaning "straight" and "tooth," shown the important and direct relationship between the symmetrical development and position of the teeth and the physical condition of the entire body.

Our profession has awakened to the fact that not only do we, as practitioners, have a very well-defined mission in conserving the health of the community, but that the field for the helpful application of our art is almost as broad as the nation itself.

There are, in round numbers, about sixty thousand dentists in the United States. These men can at most take care of but twenty million people. There are, in other words, but twenty million people out of one hundred and five million who can have the opportunity to take proper care of their teeth by visiting a dentist regularly.

This leaves eighty-five million people, most of them belonging to the great working classes, who need sound teeth for good health, but for whom there is no provision in dentistry, save perhaps to have an aching tooth extracted. Although it is most important that dental operations should be provided when needed, yet this alone covers too small a field to be a great factor in lessening the evils which it is the aim of the new science of orthodontia to correct.

Orthodontia is more than a department of dentistry; it is a science which involves physiology, hygiene, medicine and surgery. Irregular teeth, or teeth that are out of normal relation to each other, not only tend to decay, but because of their abnormal positions form protected areas for the colonization of microorganisms which add greatly to the individual's susceptibility to disease.

One of the questions which orthodontia has sought to answer is this: What is the difference in the school progress of children who have good teeth and those who have irregular and defective teeth? What is the difference in

scholarship of these children, in their height, and in their weight? An examination, based upon the official records of eight thousand school children of New York City, distributed over five boroughs, shows that children who have defective teeth require, on the average, half a year longer to go through school than those who have good teeth.

Now what is the reason for this? What is the connection between irregular and imperfect teeth and scholarship, height, and weight? The answer is this: Practically all children who have bad teeth have teeth that are more or less sensitive all the time. They masticate their food less thoroughly; they do not eat as much, and they assimilate less of what they do eat because of imperfect preparation in the mouth; hence they do not grow as well as children with perfect teeth. Having sensitive teeth establishes the bolting habit which persists throughout life.

To secure its best results, orthodontia must begin its beneficent work in early childhood. When small children have anything the matter with their teeth, it is common to hear the remark, "It makes little difference, these are just the baby teeth," and they are extracted instead of being filled and treated. In consequence of this method, every tooth removed from the child's jaw results in a lessened development of the jaw, affording less room for the permanent teeth when they come. The full contour of the jaw should be preserved by retention of the teeth until the new ones appear, otherwise the tendency to atrophy causes endless trouble. Mouth-breathing prevents the proper development of the deeper passages of the nose, which cannot be developed when the time for growth is past, and in consequence the individual is not only flat-faced, but the jawbones do not develop symmetrically, and the teeth are out of alignment, imperfect and subject to rapid decay.

Orthodontia is an angel of mercy to the child whose harmonious facial development is threatened by the ignorance of parents or has already suffered through neglect. To the layman it seems little short of miraculous to take a facially deformed, nervous, and undernourished child and make of it the healthy and beautiful creature that Nature designed that it should be.

The progress of orthodontia has been rapid and the scope of its service wonderful. As a means of preventive medicine, it cannot be equalled or surpassed. Through its benign influence, health of both a physical and mental character is made possible. The community's health is the total of the health of the various individuals that compose that community, and anything which lessens the causes of sickness and inefficiency of the individual, to that extent benefits the entire community.

As graduates of this school, it is yours to carry on a noble and beautiful work for the improvement and happiness of the race. "Freely ye have received, freely give." This school has placed within your hands the implements of service and within your minds the ability to use them for the good of your fellow beings. Let your ideals be so high as to do honor not only to yourselves but to your alma mater, which this day bids you God-speed as she says to you, "Hail and farewell."

# THE PERIDENTAL MEMBRANE FROM AN ORTHODONTIC STANDPOINT*

By C. M. McCauley, B.S., D.D.S., Los Angeles, California

WHEN an engineer plans a steel bridge to span a great stream, he first locates a solid stratum of earth upon which to rest the supporting piers. He realizes that upon the structure of this foundation stratum of earth depends the future life and utility of the bridge. The reputation of the engineer is also dependent upon the lasting qualities of this stratum of earth. So intent is he upon reaching the goal of success and safeguarding his own reputation that he takes into account all possible causes of future deterioration or destruction either from forces to be applied by man or imposed by Nature, and so nearly as is humanly possible guards against them. In other words his work is so well done that the tremendous weight from above finds support in a foundation undaunted and unharmed thereby and the force of the winds and flood waters from a lateral direction leaves a majestic structure intact and unshaken, proudly proclaiming the glory of work well done. This happy result would be impossible without a good foundation.

The life and utility of the bridge depend no more upon its foundation than do the life and utility of a tooth depend upon its foundation. The peridental membrane is the foundation of the tooth. The tooth is the bridge built by the orthodontist. The care, thoroughness and efficiency in his work bear the same ratio in importance to the care, thoroughness and efficiency in the work of the engineer *per se* as does the value of human health to the value of material things. The responsibility of the orthodontist is therefore very great, and his efforts to secure and maintain a perfect foundation for all his work should bear evidence of earnestness, efficiency and an appreciation of this responsibility. The ultimate verdict of appraisal on the value of orthodontia coming from the people is bound to depend largely upon the manner in which our practice protects the peridental membrane as well as the teeth.

These things as viewed from an orthodontic standpoint are painfully true when we realize that in spite of great care on our part there is still a tendency for our work to undermine the foundation of teeth. It becomes necessary to consider well every phase of our work in its relation to the peridental membrane. In order for us to appreciate injury to this membrane which might result from certain orthodontic procedure it is necessary that we know something of its function and structure, particularly that part with which our appliances come in contact. This will be mentioned

*Read before the Pacific Coast Society of Orthodontists, San Francisco, California, February 19, 1924.

only briefly, considering somewhat in more detail the parts of the membrane most subjected to injurious effects of our appliances.

STRUCTURE AND FUNCTION

Fibers.—

1. Gingival,
2. Alveolar,
3. Apical.

Emanating from and growing into the cementum of the tooth from its gingiva to its apex are bundles of strong fibers. These fibers are divided into three divisions for convenience, namely: gingival, alveolar and apical.

Some fibers in the gingival division pass out from the cementum at right angles to the tooth surface and turn abruptly crownwise and permeate and give support to the connective tissue underlying the epithelium of the free margin of the gums. These fibers enable the free gum margin to hug close to the tooth, thus excluding food debris and protecting the epithelial covering of the free margin in its weakest place, namely, that part of the free margin lying against the enamel at the gingiva. These fibers are subject to the same destructive effects from orthodontic appliances as are the right angle lateral supports mentioned below. Their destruction robs the gum margin of its ability to hug the neck of the tooth closely and much of the protection of the tooth and soft tissue at the gingiva is lost.

Certain bundles in the gingival division emanate from the tooth at right angles to its surface, whose function it is to hold the tooth in its position very much as the guy ropes of a tent hold the central pole in place. When these right angle fibers on all sides of the root are pulling or holding in a normal way, the tooth stands in a neutral position, and if normal, in an upright position. These fibers are particularly serviceable in lateral movements of the mandible during mastication and are subject to injury or destruction when the gingiva suffers injury from any cause. Should any of these fibers be disconnected from the tooth it would lean in the opposite direction in much the same way that a tent pole would if one of its ropes were broken. The normal action of these particular fibers plays a very important rôle in the retention of a tooth in its normal upright position after orthodontic treatment. They may be destroyed during treatment by bands set too deeply; by careless use of ligatures and especially the silk ligature; by excess cement allowed to harden and remain after pressing it out to the gingival of the band when forcing to place in adjusting appliances; by uncleanliness in the manner described later; bands which become loosened and remain uncemented working up and down, irritating the gingiva.

Other fibers emanating from the gingival region pass at right angles through the septal tissues and find their insertion in the adjoining tooth. These fibers, no doubt, exert an influence in maintaining normal contact between the teeth. They also seem to have an influence in causing one tooth to follow an adjoining tooth when moved in a mesial or distal direction.

There are other right angle fibers in the apical division which act in

conjunction with those at the gingiva in holding the tooth in an upright position but these are beyond the ordinary reach of the orthodontist. The upright support of the tooth, however, is affected by loss of these fibers from apical abscess in very much the same way as by loss of the gingival fibers. The fibers in the alveolar division are likewise beyond the reach of our appliances.

The apical two-thirds of the alveolar division extends from the tooth toward the bone in a crownwise oblique direction and comprise very strong support and resistance to longitudinal force during mastication.

### BLOOD VESSELS AND NERVES

Part of the blood vessels which supply the membrane pass from the gum over the crest of the alveolus into the gingival area, thence through the central part of the membrane toward the apex of the tooth. These carry infection from the gingiva into the deeper tissue. Others branch off from the artery in the apical region passing through the membrane toward the gingiva, anastomosing with the vessels entering from the gum.

Fibers of the peridental membrane are arranged in bundles. The unit fibers in these bundles are intertwined with each other. Nerves and blood vessels pass between the fibers of these bundles in such a manner that when force is applied to the tooth and the fibers straighten out and come together, the vessels and nerves are squeezed between the fibers, resulting in interference with the circulation which may lead to inflammation. This explains why a tooth grows so sore when ligated loosely to an arch bar and subjected to back and forth movements during mastication. Teeth should be firmly ligated to an arch bar if ligated at all, and thus use the strength of the bar to prevent undue movements during mastication. In this connection, however, caution should be observed not to attach a tooth or teeth to an arch bar in so firm and rigid a manner as to prevent function during mastication. Such a fixation, accompanied by heavy pressure, seems to interfere with circulation so as to disturb cell function, particularly that of a metabolic nature, resulting in weakened bone and loose teeth.

### LYMPHATICS

Following the course of the blood vessels of the membrane, will be found perivascular lymphatics. These follicles produce leucocytes for protection against infections and other injuries.

The peridental membrane is the most important structure with which the orthodontist has to deal, and when injured from any cause the life of the tooth is shortened. The greater degree of caution exercised by the orthodontist to prevent injury to the membrane the greater degree of success, will result from his efforts.

The gum margin should be protected against injury because of its function in the protection of underlying enamel from decay and the deeper structures from infection. The gingiva should be protected from injury because of the importance of gingival fibers in supporting the tooth in its proper

position. Such protection is afforded by careful fitting of bands, removal of excess cement from beneath the gum margin, careful use of ligatures and by hygienic measures. Bands when cut too long and forced to place, sever gingival fibers, resulting in reduced resistance of tissues and impaired support of the teeth. A wire ligature pressing upon the gingiva will produce a similar effect. Silk ligatures are very destructive to gingival tissues and should never be allowed to impinge upon that area. Any appliance which produces irritation or uncleanliness at the gingiva should be avoided when possible. If this be true it follows that bands of all kinds should be avoided when possible, and when used at all should be removed and reset at required intervals to avoid the uncleanliness that results from washing out of cement from beneath bands.

Not only in the fitting of bands but in the application of force for the movement of teeth the membrane should be taken into consideration. Force may be applied in such a manner as to maintain function and augment growth, and it may also be applied in such a manner as to prevent function and impede growth, all of which may be summed up by saying that: Every step in fitting and adjusting orthodontic appliances to the teeth should receive intelligent and thoughtful consideration, and the method and manner of applying force for the movement of teeth should be chosen with a clear conception of its action on the tissues involved.

DISCUSSION

*Dr. E. C. Read, Long Beach, Calif.*—Dr. McCauley has given us a most excellent paper upon a very timely and vital subject. We are often so interested in moving teeth that we become thoughtless of the final results of seemingly trivial injuries to the investing tissues. This paper should make every one of us more careful in fitting bands and in the use of ligatures.

Dr. Black in his book on "Pathology of the Peridental Membrane" says, "Formerly it was generally believed that most of the cases of destructive diseases of the investing tissues of the teeth were caused by deposits of calculus, and unquestionably the percentage of cases due to deposits was much greater in former years than now, the gradual reduction being due to the better care of their mouths by our people. A critical examination of the mouths of a large number of adults will establish the fact that the majority of cases at the present time result from slight traumatisms and irritations of the gingivae, and that deposits of calculus are the first cause of a minority.

"There is no more promising field for the study and practice of prevention than in the group of conditions which are the exciting causes of the inflammations of the gingivae. Most dentists seem not to have recognized many of these causes at all, or if they have recognized them, they have failed to appreciate the direct relationship between the apparently trivial gingivitis and the more serious lesion of the peridental membrane which results. It should be understood that a gingivitis precedes the pericementitis in every case, and in view of what has been said relative to the lack of power of reattachment of the peridental membrane to the cementum, it is of the utmost importance that we pay more attention to the earlier lesion, the gingivitis, which can usually be prevented or cured by very simple means."

In another paragraph he says, "Some years ago, while giving a lecture on the technic of placing the rubber dam, I called for a volunteer from the class to act as the patient in the demonstrations. A young man stepped out from a front seat. He took the chair and I looked over his mouth for a moment in some amazement because of the conditions presented. Without a word to this volunteer patient, I turned to the class

and said: 'This classmate of yours has suffered an injury to the peridental membrane of his incisors by the careless use of ligatures in tying the rubber dam, from which they can never recover.' Then, at my request, this young man told the story of his injury to the class. and spoke particularly of the pain caused by the tying of the ligatures about his teeth. I took a subgingival explorer and demonstrated to the class the depth of the pockets which had occurred as a result of that purely mechanical injury. Several of these reached fully two-thirds of the length of the roots of the teeth. Infection had occurred after the original injury and the suppuration would continue to the destruction of the membranes of the teeth, regardless of any treatment which might have been instituted at that time.''

It is doubtless too much to hope to avoid all irritation and inflammation of the gum tissue but these conditions ought at least be danger signals for us which should cause us to be extremely careful not to unnecessarily injure the gingivae.

I wish to thank Dr. McCauley personally for his valuable paper.

*Dr. H. L. Morehouse, Spokane.*—At the beginning I wish to compliment Dr. McCauley for the thoroughness with which he has covered the subject.

It is a subject which is all too easily overlooked and yet one which is often of the most vital importance to the future of the patient, which should be uppermost in the minds of every orthodontist. When I see some of the results which have been left as finished cases I wonder if the future has been thought of; when the forces of occlusion seem to have occupied but very little space in the thoughts of the operator.

The injury to the fibers of the gingival portion can be most easily accomplished, and if they are injured it is due to carelessness first on the part of the operator in the way in which he fits the appliances; but I believe there is so much, or more damage done toward the future life of the teeth by the lack of attention being given to establishing the proper angles, which if not right, will cause irreparable loss to the peridental fibers in the alveolar and apical region through the wrong application of the forces of mastication.

A review such as Dr. McCauley has given, is a splendid thing because it seems as though with the rush and crowding of a practice, none of us take as much time as we should to review our histology and anatomy. There are many points of importance which easily slip our minds.

Again I wish to thank Dr. McCauley for bringing this subject before us.

*Dr. Vance Simonton, San Francisco.*—There are several stages involved in work of this character. The first is that of procurement of material, either by operation or by animal experimentation. In the latter case, we have not only to perform the experiment, but to wait a varying period of time for the reaction, before the tissue can be secured. Secondly, it is necessary to prepare the material for microscopic study, and this involves that particular degree of technic peculiar to preparations of hard and soft tissues in close association. Finally, there is the matter of interpretation, and even this may lead back to investigations of technical methods of preparation. At the present moment, I have nothing of value to present in regard to the histology of the tissues under discussion. We are busy now with surgical experimentation, procurement of tissues and their preparation. It may be months yet before we will have the data available for interpretative studies.

*Dr. C. C. Mann, Seattle.*—What type of appliance did Dr. McCauley refer to in his argument against its use?

*Dr. McCauley,* closing discussion, and answering Dr. Mann.—I had in mind such appliances as the ribbon arch.

# PHYSIOLOGY OF THE ALIMENTARY TRACT AS A WHOLE*

DR. FRANCIS P. WISNER, UNIVERSITY OF CALIF., SAN FRANCISCO, CALIF.

IT is indeed a pleasure to meet you today, especially since I am doing so in the capacity of a medical man. It is our opinion that both the dental and medical professions have suffered considerably, due to the attempt in our schools to separate them into two distinct entities. It is obvious to us all that they are simply integral parts of a large whole. The points of contact are multitudinous, and we are rapidly discovering that a considerable knowledge of both subjects is essential to a successful practice of either. I am at present engaged in a piece of work which is neither wholly medical nor wholly dental, in character. It lies distinctly on the borderline between the two professions. Its success depends upon our ability to secure daily consultations with the men of both professions. So it is only natural that I should welcome any such opportunity as this, to attempt to make available to one profession the truths upon which the other is founded. In choosing the subject of this paper, I felt that possibly a clearer idea of the importance of orthodontic work might be obtained from a brief survey of the functions of the entire alimentary tract. I will beg your indulgence in case it consists too largely of a review of the simplest physiologic principles.

For illustrative purposes, let us consider the alimentary canal in its simplicity, as it occurs in one of the lower forms of life, such as the earthworm. Here, it is in effect, simply a hollow tube traversing the entire length of the animal's cylindrical body. Thus, its contents, while in a certain sense within the animal, are not yet truly within the substance of the worm. The illustration holds good for the elaborately convoluted tube which lines the human body. The contents of this tube are still literally outside the body, until they have been absorbed into the tissues comprising the intestinal wall. Tributary to this long digestive tube, are certain glands, as the pancreas and liver, which empty into it at appropriate places by means of their ducts. The various segments of the entire tract are potentially separated from each other by muscular rings, known as sphincters. The lips, guarding the oral aperature, are to be regarded as the first in the series of these sphincters which the food encounters.

Mastication, which is the first chapter in this interesting story, will be passed over rather hastily. Suffice it to say here, simply that it serves to crush the food, breaking it into smaller particles, and mixing it to some extent with the saliva. This, and swallowing, are processes which are under the direct control of the will, being performed by the so-called voluntary type of muscles. Almost the entire remainder of the work of digestion and

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elimination is performed by the involuntary type of musculature. Peristalsis is the process by which the food material is passed on and on within the intestines. This is made possible by means of a most interesting mechanism. The rate of activity is greater in the upper portions of the tract, and gradually diminishes as we approach the lower levels. This conception of a gradient in the activity of the various levels of the tract, is to a large extent the contribution of one of our local men. It is valuable in explaining many of the phenomena of intestinal motility. Thus, the act of vomiting is thought of as being due to a temporary reversal of this gradient of activity. A knowledge of the times at which food material should normally pass by certain points, is of value in our estimate of disease, which may serve to delay the food. It requires but a few seconds for the food bolus to traverse the pharynx and esophagus, in going from the mouth to the stomach. Normally, by the end of four hours, all the food has left the stomach, and by nine hours has reached the large intestine. In from twenty-four to seventy-two hours, the remains are discharged from the rectum as feces. We are learning that motor activity, either when lacking, retarded or perverted, plays a much more important rôle in disease of the gastrointestinal tract, than do variations in secretion.

However, these secretions, as we shall see, are all important for the proper assimilation of foods. Most important of all, from the standpoint of digestive action, is the pancreas, whose juice contains three distinct enzymes. The secretions of the stomach, salivary glands, and intestines are also of importance in this respect. These various organs are stimulated to secretory activity by a variety of factors. Thus, the sight, odor, or even the thought of food is sufficient to excite the salivary glands to activity.

Mastication is of prime importance in breaking up the food into smaller particles, thereby increasing the total surface which may be acted upon by the digestive juices. It also serves to liberate many of the food-stuffs from the microscopic capsules of cellulose and fiber, by which they might otherwise entirely escape digestion. Cooking serves also the same purposes, to some extent, and in addition, it initiates the process of hydrolysis by which the more complex foodstuffs are split up. The different food elements are acted upon by the digestive juices; each type being dealt with in a special manner. Water is, in a sense, the most important constituent of our food. It is the universal solvent, in which all the chemical reactions of metabolism occur. From 70 to 90 per cent of all living tissue is simply water. It serves also as a stabilizer and conserver of heat. The inorganic salts, are, of course, absorbed from the digestive tract, as such. They serve quite a variety of purposes in the animal economy. By means of the osmotic pressure which their solutions exert, they control the interchange of fluids in the various organs and glands. They are also of importance in the maintenance of alkaline or acid reaction in the various fluids and secretions of the body. They also enter into the very substance of teeth, bone, and other tissues. In addition to all this, the metallic ions, in their antagonism against each other, serve to regulate such functions as the permeability of membranes, the irritability of nerve and muscle, and the clotting of blood. The carbohydrates,

fats and proteins are acted upon in the lumen of the gut, by the appropriate enzymes, before they are absorbed. The carbohydrates are broken down by the diastases, into the simplest of sugars (usually glucose) before being absorbed, after which they are reassembled within the liver, where they are stored as glycogen, or animal starch. The carbohydrates furnish a readily accessible supply of fuel for the supply of heat and energy. The fats are broken down by lipases into glycerine and fatty acids, in which form they are able to diffuse through the membrane lining the intestines. Once within the lymphatic vessels, these substances are reassembled into fats, which differ somewhat in their construction from the fats which were contained in the food. The fats provide a type of fuel which is readily stored for future use. The proteins, which are the most complex of all the food substances, are split up by means of proteases after a number of reactions, into their constituent amino-acids, in which form they are absorbed into the circulation. The proteins which are resynthesized within the body, differ materially from those which were ingested. This beautiful mechanism by means of which the body breaks down the complex foodstuffs into their constituent components, and later builds them up again into its own peculiar type of substance; is simply its method of preserving its own chemical integrity.

A few words should be said of the functions of the liver. We have already had occasion to refer to the storing of glycogen within this organ. Certain very important steps in the synthesis of complex fats and proteins, are thought to occur within this organ. It is important in the neutralization of poisons and the fighting of bacteria. The bile which is secreted by the liver, serves to stimulate peristalsis, and also aids in the fat-splitting process. Some of its constituents are thought to represent true excretions. The feces are not to be thought of so much as excretory products, as they are indigestible and unabsorbable remains, plus the bodies of countless numbers of bacteria.

We have followed the food substances through the entire alimentary tract, and have seen how the utilizable materials are prepared for absorption into the body. We have also seen how perfectly its construction adapts it to its function. The relation of these different factors to diseased states is being extensively studied at present, and its final solution lies in the future. The present indications are, that oral conditions play a most important part in the integrity of the entire tract. Thus, our ultimate success is directly dependent upon cooperative efforts between the two professions.

## DISCUSSION

*Dr. Allen E. Scott, San Francisco.*—I wish to compliment Dr. Wisner on the clear and concise presentation of his subject, and I am sure that we are very grateful to him for the opportunity of hearing his views on this most important matter which so vitally concerns both the medical and dental professions. As dentists, we are apt to consider the mouth as a unit, forgetting its more important function in regard to the physiology of the entire alimentary tract. Although we are not accustomed to think of our work as such we are really engaged in an endeavor to place the teeth in such a position and relation that they will perform their proper physiologic function. When the teeth function properly we generally have a normal development of the entire body and particularly the face, the development taking place through metabolism as well as exercise. If malocclusion exists to

such an extent as to interfere with the proper mastication of food, the teeth are not fulfilling their proper function and an underdevelopment of the face is in most cases quite apparent. Accompanying this condition we may find digestive disturbances.

It is interesting to note how perfectly the construction of the alimentary tract is adapted to its function, the mastication of food and the mixing with the various secretions so as to break it down in order that it may be properly assimilated.

*Dr. P. T. Meaney, Portland, Oregon.*—In discussing Dr. Wisner's very clear and concise paper on the physiology of the alimentary tract with the intention of showing the importance of our particular field upon the normal function of same, I first wish to thank Dr. Wisner for his very humble feelings in being willing to cooperate with men of the dental profession when after all we should be working as a unit, as the human body could be likened to a chain which is no stronger than its weakest link.

It is impossible for men in the medical profession to throw aside the idea that infections in the mouth, or mouths poorly developed having a mechanism by which food is improperly prepared and instead of being absorbed causes a disturbance of normal absorptive function in the alimentary tract, thereby cheating the patient out of the very important food supply, the life of normal cell metabolism, which is essential to keep all of the tissues in a good normal condition.

It will be necessary for me to digress from the physiology of the intestinal tract as would be found in the average individual where the oral cavity is average normal and apply this physiology to those cases requiring treatment where the intestinal tract must be influenced by the lack of proper mastication, due to irregular teeth or illy-developed bone and muscles of the head, neck and chest.

I would like to have Dr. Wisner appreciate the orthodontist's viewpoint in the correction of cases that present themselves to us for treatment. Let us consider the mouth breather, whose supply of air is taken through the mouth, due to obstruction or undevelopment of the nasal tracts. We find these children underweight, flat chested and without doubt their whole system is being influenced by the lack of development and functions of the bone and tissues of the face, head and chest. What effect do these underdevelopments have upon the physiology of the intestinal tract?

Insufficient development of the bones of the face and head must influence normal function of the saliva glands. Engorgement of the cells in the lung, due to irritation of the soft tissues of the bronchial tubes, from inhaling dust-laden and unwarmed air surely must have its effect upon the normal functions of the digestive tract through disturbing the circulation of the blood.

I mention this class of cases in this discussion, due to the fact that the cases that I have described as mouth breathers in most instances if allowed to grow to manhood or womanhood are short lived and are a sad sight at the best.

I would appreciate the application of this subject to these particular underdeveloped children.

*Dr. James D. McCoy, Los Angeles.*—I am sure I express the sentiment of all present when I say we have all enjoyed Dr. Wisner's paper. At the time of its publication we shall read it with profit. It is too highly technical from the physiologic standpoint for one who is not a trained physiologist to enter into an elaborate discussion of it. We have all enjoyed it, and appreciate the effort of the essayist in writing it and coming here and delivering it.

*Dr. W. J. Bell, Los Angeles.*—We frequently find that children whose teeth are not in a position to properly masticate food are very hearty eaters. They swallow their food in a bolus, without chewing. In such cases I have noticed invariably they may be classed as anemic. We know that food is not properly nourishing the body, and that in excessive amount it may be a real hindrance to the body. A little explanation of that probably would be appreciated.

*Dr. Wisner.*—In the first place it is probable a certain amount of the food, as was indicated in my paper, is not accessible to the digestive juices, due to the fact that the envelopes in which it is contained are not broken down during mastication, and cannot be subsequently broken down in any other part of the alimentary canal, and much of the food is therefore inaccessible to the digestive juices.

*Dr. Bell.*—What is the detriment of that food passing through the alimentary canal in the condition you have stated?

*Dr. Wisner.*—Possibly it may result in an unbalanced type of diet. If the diet consists too largely of fats without enough carbohydrates with it that would result in an improperly balanced condition, and the fat cannot be utilized by the body without a sufficient bulk of carbohydrates along with it to help burn it up. The carbohydrate is the flame in which the fat is burned within the body tissues. The carbohydrates are contained within these plant and animal envelopes, whereas the fats are apt to be more or less free and easily absorbed. So some such conditions as indicated may supervene.

*Dr. Bell.*—Is not excessive food a good field for bacteria, and may not toxins be absorbed?

*Dr. Wisner.*—That is true. The bacteria may gain access to the food and split it up in a different manner than the intestinal juices would split it up and you might get so-called toxic products. At present there is a tendency among medical men to discredit the idea of autointoxication. The pendulum has swung away from that concept.

*Dr. Scott.*—We are told some times that most of us eat about three times too much. Is that true?

*Dr. Wisner.*—I do not know of any experiments along that line. If we utilize our food to the utmost, masticate it thoroughly, and assimilate it thoroughly it is probable we do eat a considerable excess to satisfy our taste. The stomach requires a certain amount of bulk to be thrown into it, and the hunger is not satisfied until that sensation of fullness is attained, regardless of the concentration of the food taken.

*Dr. Scott.*—Would not most of this food have to get into the large intestine to become toxic?

*Dr. Wisner.*—That is hardly true. It is probably in the lower portion of the small intestine that the maximum of bacterial action occurs. By the time the food reaches the large intestine it has become dehydrated, and bacterial processes are on the wane.

*Dr. —. —. Fury, Long Beach, California.*—In the matter of iron taken internally I think the only correct way is hypodermically. Does this act as a stimulant to the gastro-intestinal tract? or does it unite with a hematin of the blood in caring for the waste products, and would it be advantageous to children in our line of work to build up their condition?

*Dr. Wisner.*—The function of iron is chiefly for building up the blood, to render the patient less anemic, and not so much to correct digestive disturbances primarily. Secondarily, it may do so through an increase of the hemoglobin content.

*Dr. Fury.*—What is the effect of iron on the youngsters?

*Dr. Wisner.*—To build up the blood and render them more vigorous. To increase the hemoglobin content, and add to their muscularity in the same way, and not for any direct action on the intestinal tract.

*Dr. C. M. McCauley, Los Angeles.*—Like Dr. Bell, I should like to ask about the effect of swallowing unmasticated food. A study was made by the research department of the First District Dental Society of New York, along the line of effective mastication of different foods. They found that certain foods were digested better when masticated, while certain others would digest without mastication. The carnivorous animal lives on meat almost exclusively and does not masticate it. Nature has not provided them with molars with which to masticate. The food is swallowed whole and digested by the fluids of the stomach. On the other hand, some vegetarians have nothing but molars. The cell

contained in starchy foods, grass, etc., cannot be digested until it is broken down, according to the report of this Committee, and to break down those cells organs such as molar teeth are required. Starches fed to animals without molars pass through the system undigested and starches fed to animals with molars are digested. Meats fed to animals without molars were digested-without mastication. The conclusions reached by this Committee were that starches were not digested unless they were thoroughly triturated, and that meats are digested without mastication. That was the finding of some of our dental research workers of some years ago, and was accepted by the dental profession. Is it accepted today by the medical profession?

*Dr. Wisner.*—I have not read the particular journal you have reference to. I would say you could accept that as a fairly good rule to go by. For instance the vegetable foods are surrounded by a capsule of cellulose or rather inert material on which no digestive juice has any action and the breaking up of that envelope has to be mechanical, whereas the animal cells as one finds them in meat are contained within an animal type of membrane, elastic or fibrous material, and that even if it is not mechanically broken up by means of mastication it can be to a considerable extent removed by the process of digestion within the stomach and intestines, so the body has an excess of that material, regardless of mastication.

*Dr. Suggett.*—What causes an ulcerated stomach, and what is the bad effect that follows, Does the stomach become functionless? i.e., do you have that much surface left for functioning?

*Dr. Wisner.*—The subject of gastric ulcers is a big field. One of the most prominent causes is pyorrhea and all types of oral sepsis. In regard to the symptoms which would result, the chief one is that of pain in the region of the stomach. It is not so much the loss of stomach surface as it is the distortion of the shape of the stomach, particularly if the ulcer is in the region of the pylorus, the inner opening at the far end of the stomach. When the ulcer occurs in or close to the pylorus a spasm of the muscle is induced by the pathologic process there, and it is difficult for the food to pass by into the intestine. There is a delay there, and in taking an x-ray plate after giving a barium meal instead of the stomach being empty within four hours, a large residue is left, even at the end of six hours. That will result in vomiting, as the material cannot be utilized. It is not so much a loss of functional tissue, as it is the pain resulting from it, and the muscular spasm with the distorted function.

*Dr. Bell.*—That is a different conception from what I have always had of an ulcer. In the old question, "Why does not the stomach digest itself" it was demonstrated that a live frog's leg inserted in the stomach was easily digested and the answer given as to why the stomach does not digest itself was that there was a certain film or secretion which protected the cells of the stomach, so that the gastric juices do not come in contact with them. The cellular activity of that portion of the stomach which is diseased I think has ceased to be a function, leaving that portion open to attack.

*Dr. Wisner.*—What is it that has destroyed that portion of the stomach?

*Dr. Bell.*—Perhaps overeating, too much smoking, or various other causes which disturb the natural functions of the stomach.

*Dr. Francis P. Wisner, San Francisco.*—I had a few misgivings in coming here, fearing possibly the context of my paper would consist too largely of simple physiologic facts with which you were all familiar from your college work, and that possibly no discussion would result. The trend of gastrointestinal physiology as a matter of fact does not differ materially from year to year, and my chief purpose has been simply to try to complete the story for you. You are accustomed to thinking of food in the mouth; the action of teeth on the food; the mechanism of proper occlusion, etc., and I thought it would be of benefit to stop a moment and think of the closing chapters of this same story with which you are dealing to see what happened to the food as it passes on from the mouth. If my presentation has resulted in a clearer conception of these later stages in digestion I will feel very much gratified.

# A PRACTICAL TALK ON MOLAR BAND TECHNIC*

By Dr. Harvey A. Stryker, Santa Ana, California

LIKE unto the house built upon the rock or upon the shifting sands, orthodontic anchor bands must constitute the very foundation of the fixed orthodontic appliance. This fact singularly reflects the relative position molar band technic must hold in our orthodontic procedures. It is imperative therefore, that we have an adequate conception of the requirements necessary, so that we may effectively contribute, in a cooperative way, to real progress in our specialty.

Among other considerations the success of the anchor band is dependent first, upon the extent of our knowledge of the forms of molar teeth; second, the standard and quality of the materials and instruments used and, third, improved technic.

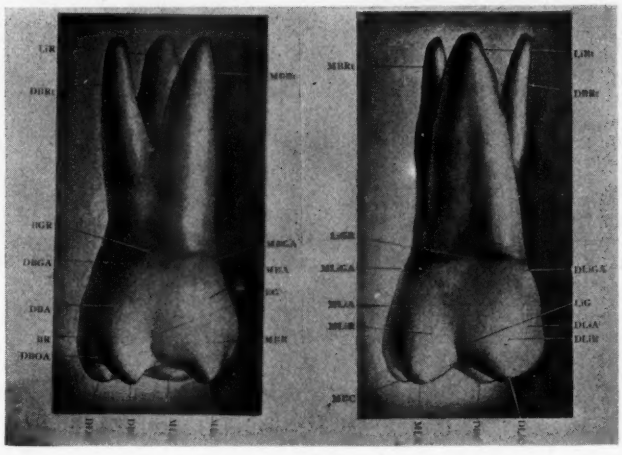

Fig. 1.—(Dewey.)

It is perfectly obvious that one must have an intelligent and comprehensive understanding of the forms of molar teeth in order to work expeditiously and accurately. To this end I shall ask your patient indulgence for a few minutes in a review of the anatomical forms of the maxillary and mandibular first permanent molars and the second deciduous molars. In Fig. 1, is shown the buccal surface of the maxillary first molar on the left and the lingual surface on the right. *The buccal surface* of the maxillary first molar is irregularly convex. Its length is about equal to the mesiodistal breadth at the gingival line, while the width at the widest point, near the occlusal margin, is about three-tenths greater. Therefore, the mesial and distal margins con-

*Read before the Pacific Coast Society of Orthodontists, San Francisco, California, February 18-19-20, 1924.

verge toward the neck. The mesial margin is almost straight, after the rounding of its mesioocclusal angle, but the distal is convex. The occlusal margin is surmounted by the buccal cusps, between which there is a deep notch, through which the buccal groove passes from the occlusal to the buccal surface. This groove passes centrally toward the gingival line about half the length of this surface, dividing the occlusal portion into a mesial and distal buccal ridge.

*The lingual surface* is divided in a line with the long axis of the tooth into a mesial and distal lobe by the lingual groove. Both lobes are smoothly convex from mesial to distal, and in a less degree from the gingival line to the occlusal margin. The gingival line is nearly horizontal, and so sunken as to give the appearance of a gingival enamel ridge. The occlusal margin is surmounted by the mesio- and disto-lingual cusps, of which the mesial is usually the larger. In the five-cuspid molar the fifth cusp is seen on the mesio-lingual lobe. The mesial and distal margins are convex, converging

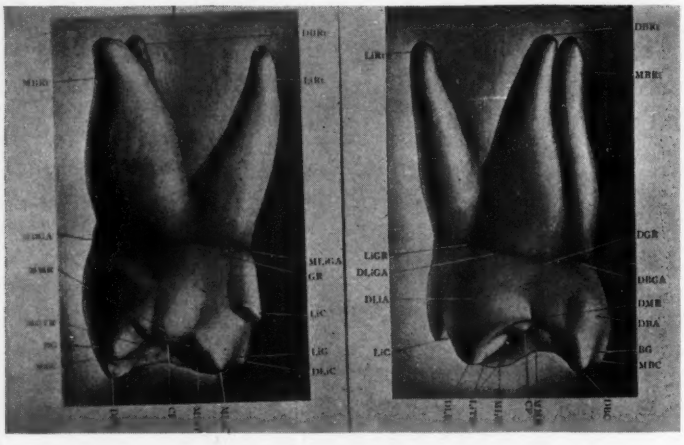

Fig. 2.—(Dewey.)

rapidly toward the lingual root. In the few examples in which the lingual groove is not apparent, the lingual surface is smoothly convex from mesial to distal.

In Fig. 2 is shown the mesial surface of the maxillary first molar on the left and the distal surface on the right.

*The mesial surface* is nearly flat in all directions, and its margins are rounded to the buccal and lingual surfaces. Toward the occlusobuccal angle, the flat surface is continued well up to the occlusal surface, which it meets in a fairly sharp angle; but as it approaches the linguoocclusal portion it is progressively rounded toward the occlusal surface. In many molars, near the gingival line, half-way from buccal to lingual, this surface is a little concave.

*The distal surface* in its lingual half, is convex in all directions, but in its buccal half there is often a concavity formed by a considerable distal protrusion of the distolingual lobe. This is a shallow, but marked, depression running from the bifurcation of the distal and the lingual roots toward the distobuccal cusp. It crosses the gingival line at a point about one-third

distant from the buccal toward the lingual margin. In many examples this depression is more central and receives the distal termination of the disto-lingual groove, which may often be traced as a fine line nearly or quite to the gingival border of the enamel. This complication of the surface makes the finishing of fillings, and the fitting of bands for crowns, specially difficult. This depression falls short of forming a concavity in about one-fourth of the first molars.

In Fig. 3 is shown the buccal surface of the mandibular first molar on the left and the lingual surface on the right.

*The buccal surface* of the mandibular first molar, when seen at right angles with the long axis of the tooth, is irregularly trapezoidal in form, with the occlusal margin about two-sevenths longer than the gingiva. The mesial and distal margins converge toward the gingival, and the angles with the occlusal surface are about equally acute. The occlusal margin is broken into three elevations, or cusps, by the buccal and distobuccal grooves. The

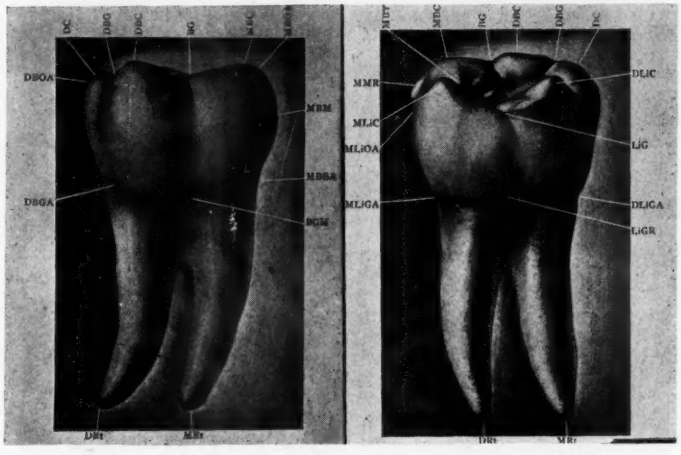


Fig. 3.—(Dewey.)

gingival line is straight, or slightly curved, with the concavity toward the occlusal surface. The mesial and the distal lines are slightly convex. The buccal surface is convex in all directions; but the line of convexity from mesial to distal is broken toward the occlusal margin by the buccal and disto-buccal grooves which pass over from the occlusal surface.

*The lingual surface* of this tooth is slightly convex in all directions. It forms a fairly sharp angle with the occlusal surface, but is rounded away toward the mesial and distal surfaces. On account of the lingual convergence of the mesial and distal surfaces, the lingual surface is much shorter mesiodistally than the buccal. The occlusal margin is deeply notched by the passage of the lingual groove, which usually terminates near the center of the surface by becoming shallower.

In Fig 4 is shown the mesial surface of the mandibular first molar on the left and the distal surface on the right.

*The mesial surface* is very irregular in outline, and often the occlusal margin is deeply concave. The gingival curvature is generally marked, and the buccal and lingual marginal lines convex. The buccal margin of this

surface is more convex than the lingual, and its curvature is at such an incline as to render the gingival marginal line much longer than the occlusal. The surface is slightly convex, though almost flat; but, in the central portion, near the gingival line, it is sometimes slightly concave from buccal to lingual. It is rounded away toward the mesiobuccal and mesiolingual angles. With the occlusal surface it forms a sharp angle in the central portion, but this is rounded in its buccal and lingual portions. In the direction of the long axis of the tooth there is usually a concavity at the junction of the enamel and cementum.

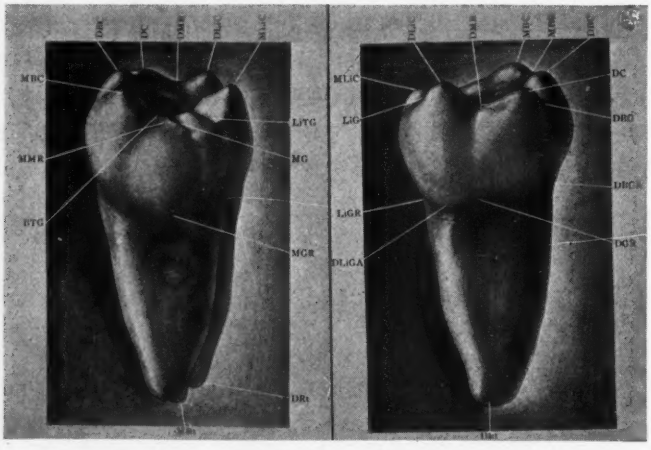


Fig. 4.—(Dewey.)

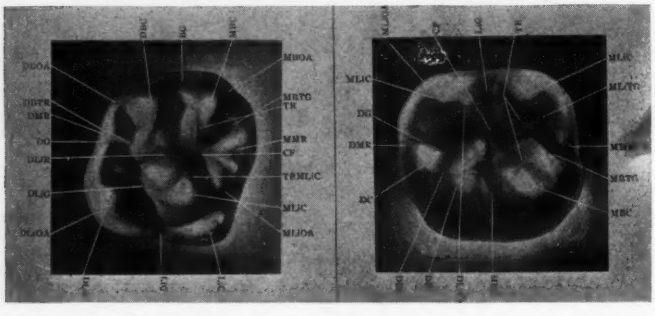


Fig. 5.—(Dewey.)

*The distal surface* is smoothly convex from buccal to lingual. From the occlusal surface to the gingival line it is straight or slightly convex, but forms a considerable concavity at the junction of the crown with the root, which occasionally forms a sharp angle, but generally is well rounded. The occlusal margin is often deeply notched by the distal groove. In a few examples the distobuccal groove is deep after passing over the marginal ridge, and in its distal inclination forms a slight concavity near the distobuccal angle.

In Fig. 5 on the left is shown the occlusal surface of the maxillary right molar and on the right the occlusal surface of the mandibular right molar.

*The occlusal surface* of the maxillary first molar when seen in a line with the long axis of the tooth, presents an outline of irregular rhombic form,

with the mesiobuccal and distolingual as acute angles. The angles are rounded, with more or less convexity of the marginal lines. This surface presents two principal fossae, and four developmental grooves; these grooves divide the crown into four lobes, or primary developmental parts, each of which is surmounted by a strong cusp. These lobes, or cusps, are the mesiobuccal, distobuccal, mesiolingual, and distolingual.

In many examples of the maxillary first molars, but in no others, there is a small fifth lobe or cusp. This is situated on the lingual side of the mesiolingual lobe, from which it is divided by a fifth groove, the mesiolingual, which runs from the lingual portion of the mesial margin diagonally to the lingual margin, and joins the lingual groove. This cusp, when it occurs, is always bilateral, i.e., on both the right and left maxillary first molars. It is hereditary, appearing regularly in the teeth of children when present in the teeth of both parents. It occurs also, in a modified form, when present in but one parent.

| Table of Measurements of Upper and Lower First Permanent Molars, in Inches and Hundreths of an Inch. | Mesio-distal diameter of crown | Mesio-distal diameter of neck | Bucco-lingual diameter |
|---|---|---|---|
| Upper First Molar | | | |
| Average | .42 | .29 | .46 |
| Greatest | .47 | .31 | .47 |
| Least | .35 | .27 | .43 |
| Lower First Molar | | | |
| Average | .33 | .33 | .40 |
| Greatest | .37 | .37 | .45 |
| Least | .25 | .29 | .39 |

Fig. 6.—(Dewey.)

*The occlusal surface* of the mandibular first molar when seen in a line with the long axis of the tooth, is trapezoidal, with the buccal marginal line the longest. The buccal angles are about equally acute, while the lingual angles are equally obtuse, and all are more or less rounded. The buccal margin is convex, but made irregular by two buccal grooves. The lingual margin is nearly straight, but sometimes slightly concave, or notched in the center of its length, by the lingual groove; but more generally it is slightly convex. The mesial and the distal margins are nearly straight in the best formed teeth; though the distal is sometimes considerably convex, as the fifth, or distolingual cusp is more or less prominent. All of these margins vary as to their convexity; the rule being that, in teeth of large size and symmetrical development, they approach nearer to straight lines. The occlusal surface has five developmental grooves, the mesial, buccal, distobuccal, lingual, and distal, which divide it into five developmental parts, or lobes. These are the mesiobuccal, distobuccal, mesiolingual, distolingual, and distal lobes; each bearing a cusp of the same name.

It is interesting in connection with the study of the forms of molar teeth, to observe Black's table of measurements of the maxillary and mandibular

first permanent molars. (Fig. 6.) As we are only interested, at this writing, in those measurements which are vitally concerned in the construction of an orthodontic anchor band, other measurements have been excluded.

By way of explanation, the "mesiodistal diameter of crown" is the extent from mesial to distal in the greatest diameter, or at the points of proximate contact. "Mesiodistal diameter of neck" is the measurement at the gingival line. "Buccolingual diameter" is the measurement taken at the

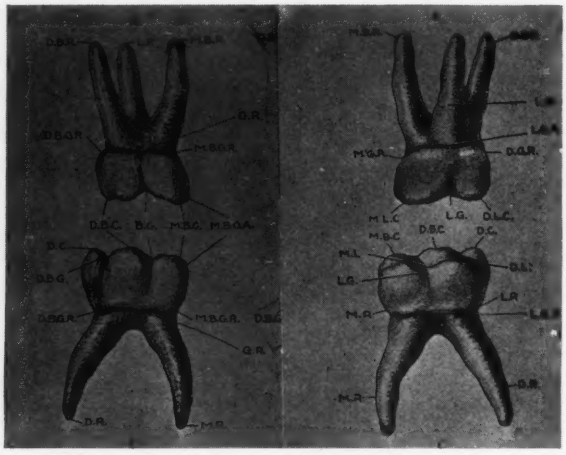

Fig. 7.—(Dewey.)

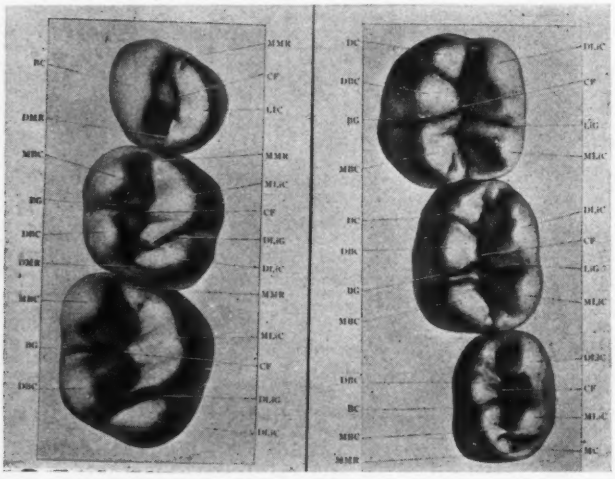

Fig. 8.—(Dewey.)

greatest diameter of the crown in the direction named, which is construed to be the measurement at or near the gingival line.

It will be observed from these measurements, which were taken from a large number of teeth, that almost without exception the buccolingual diameter is greater than the mesiodistal diameter, and, that the mesiodistal diameter at the gingival margin is less than the mesiodistal diameter at the point of approximate contact.

It is of great importance that we bear these facts in mind during the process of fitting an anchor band to these teeth.

On the left is shown the buccal view of the maxillary and mandibular second deciduous molars; on the right, the lingual view of the maxillary and mandibular second deciduous molars. They present the same anatomical markings as the permanent molars of the same series and practically the same outline as regards the cusps, lobes and grooves. The distal lobe of the mandibular second deciduous molar is larger than the distal lobe of the mandibular first permanent molar, and therefore the distal border of the mandibular second deciduous molar projects distally until it is perpendicular with the border of the maxillary second deciduous molar. In other words, we find in the mandibular second deciduous molar that the buccolingual diameter is less than the mesiodistal diameter in the ratio of .34 to .38 as an average. In the maxillary second deciduous molar the reverse is true in that the buccolingual diameter is greater than the mesiodistal diameter in the ratio of .39 to .32 as an average.

Regarding the mandibular second deciduous molar, therefore, the occlusal circumference at the point encircled by a plain band exceeds the gingival circumference by at least four one-hundredths of an inch, as an average.

This data bears out the observation and experience of many orthodontists, that the deciduous molars, and particularly the mandibular second molars, are the hardest teeth in the mouth to properly fit with a plain band.

In Fig. 8 is shown the relative size and proportion of the first and second deciduous molars with the permanent molars of the maxillary and mandibular arch.

## MATERIALS

Our first choice of a banding material should be one that is hard and resilient. The most popular alloy in present use is one in which the chief ingredients are gold, platinum, and palladium.

One good quality which is much in favor of an anchor band is that when placed on the tooth it goes to place with a "snap" and is removed only with some difficulty. If the material possesses the required amount of rigidity the gingival edge may be crimped in such a manner that when placed upon the tooth it grips, or "takes hold" slightly.

It is true that a band that is easily formed is almost invariably equally easily unformed. Also, a band material which does not readily burnish to the tooth will spring away and will never perfectly fit the circumference of the molar, especially on the mesial or distal surfaces.

If bands are too liberally festooned or if the anchor band material chosen is so soft and pliable that the material goes to place with a dead bend, it is impossible to secure a grip of the band to the tooth above mentioned.

Men vary in their ideals of practice as they do in their ability as operators. What seems difficult technic to one appears easy to another and, in this respect, it might be said that the experience of the individual has much to do with the question. It is apparent, however, that *the stiffer materials are becoming more and more recognized as the most practical for the construction of orthodontic anchor bands.*

Again, gold refining companies in past years have been without proper

testing instruments and the lack of proper standardization of banding materials has in part been due to their lack of knowledge of the materials they have been making. These testing instruments for precious metals are only a very recent development.

By the use of a newly devised instrument Mr. Reginald V. Williams has worked out a graphic stress and strain diagram on five grades of materials, as shown in Fig. 9. These diagrams are obtained by simply placing a fixed length, in this case three inches, of banding material between two metal jaws and pulling the material apart. By this test the tensile strength of the

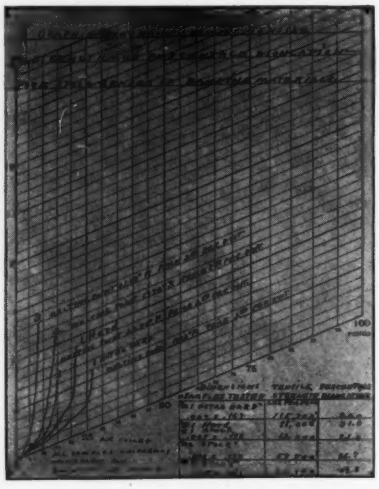

Fig. 9.—(Williams.)

| | |
|---|---|
| Bicuspids<br>Upper laterals<br>Lower incisors | .003 x .12 |
| Upper centrals<br>Cuspids | .004 x .12 |
| Deciduous molars | .005 x .15 |
| Permanent molars | .007 x .17<br>.007 x .20 |

Fig. 10.

material is obtained, also the amount that the material stretches. The red lines representing the stress and strain of each material all start from a common point of zero. The end of the line represents the point at which the material broke. The force applied to a material is termed "stress" and the resulting deformation "strain."

It will be seen therefore that the material whose stress diagram extends the farthest to the right, as in No. 1, extra hard, is the material possessing the greatest tensile strength. The material whose strain diagram extends farthest from the bottom, as in No. 3, is the material possessing the greatest

pliability. Somewhere between these two extremes there is a material that should ideally suit the majority of orthodontists.

Elongation is the amount that a metal stretches up to the breaking point. It is measured in terms of percentage.

By direct reading on the chart we find that banding material No. 1, extra hard, which was .007 × .167, broke under a stress of 115,700 lbs. per sq. inch. Again this same alloy showed an elongation of 20 per cent. No. 1, hard, broke under a stress of 88,000 lbs. per sq. inch and showed an elongation of 31 per cent. No. 1, stock, showed a tensile strength of 62,000 lbs. and per-

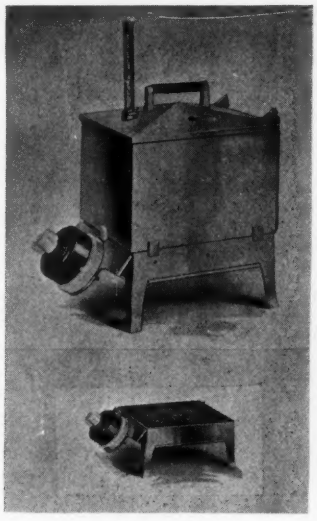

Fig. 11.

Heated to Cherry Red and Plunged Hot ----- #1 Ex. Hard 100,000 lbs. per sq. in.

Heated to Cherry Red and Air Cooled ----- #1 Ex. Hard 115,000 lbs. per sq. in.

Heat Treated or Hardened ----- #1 Ex. Hard 135,000 lbs. per sq. in.

Fig. 12.—(Williams.)

centage elongation of 21 per cent, etc. In all these experiments Mr. Williams used a 500 pound weight instead of a 100 pound weight.

The gauge of banding material is a very important factor. A material .003 in thickness should adjust twice as easily as a material .006 in thickness. An orthodontist should ideally use at least four materials of varying tensile and elongation or at least four different gauges of the same material.

In Fig. 10 is shown an outline of the different widths and gauges of band material that can be used to advantage for both anterior and posterior teeth. *It is needless to say that one does not reach the point of real efficiency in band technic unless due consideration is given to the selection of the proper widths and gauges of material.*

Another important factor in obtaining satisfactory results is the question of heat treating and tempering. We must differentiate between the

two. The process of "tempering" is the relieving of a strained or hardened condition, it is really softening of a material. "Hardening or heat treatment" is accomplished by exposing the material to a temperature of approximately 600° F. for five minutes. This can be done by placing the material to be hardened on an electric hot plate.

The electric oven shown in Fig. 11 is quite ideal for this purpose. It was originally designed for drying out cast inlay investments. It has a heating range up to 800° F. which is controlled by a three-way switch, and equipped with thermometer. The construction is of cast aluminum. The oven part lifts off the heating unit, so that the bottom part can be used as an ordinary "Hot Plate" or a modeling compound heater. It is made for use with either gas or electricity and is put out by the Harry J. Bosworth Company of Chicago.

Taking for example No. 1 extra hard (Fig. 12), we note that when it is heated to cherry red and plunged hot the tensile strength is decreased from

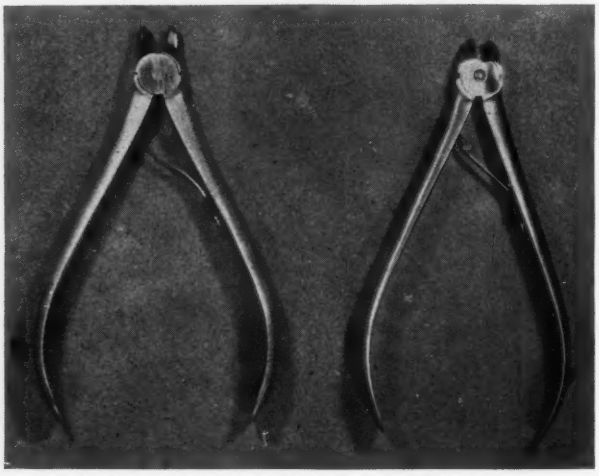

Fig. 13.

115,700 pounds to 100,000 per sq. inch; when heated to cherry red and air cooled the tensile strength remains practically unchanged, but, when heat treated or hardened the tensile strength is increased 35 per cent or from 115,700 pounds to 135,000 pounds per sq. inch.

It should be remembered then that when heat treating to obtain maximum hardness never heat the material to redness. When heat treating to obtain maximum softness (tempering), always heat to redness and plunge immediately into cold water or pickling solution.

The hardening effect is due to the formation of intermetallic compounds. Some combinations of metals form intermetallic compounds while others do not. If an alloy does not harden slightly by air cooling there is no use in attempting to produce hardness by oven or hot plate treatment.

It is quite apparent, from the results of recent experiments, that the orthodontist and the gold refining companies are enjoying a closer relationship, which should eventually be reflected in appliances that we would be pleased to call "Mechanically perfect and physiologically efficient."

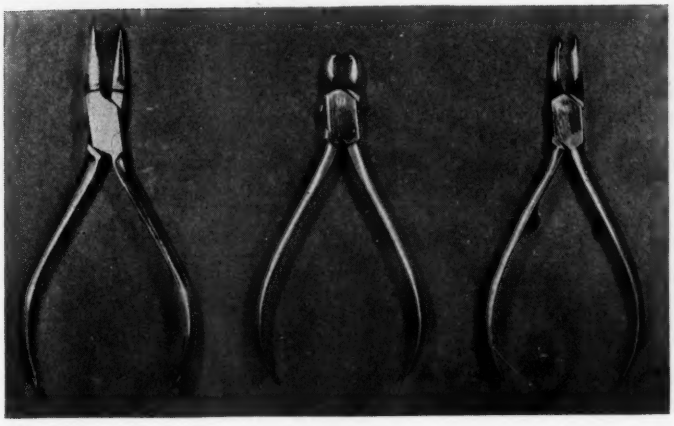

Fig. 14.

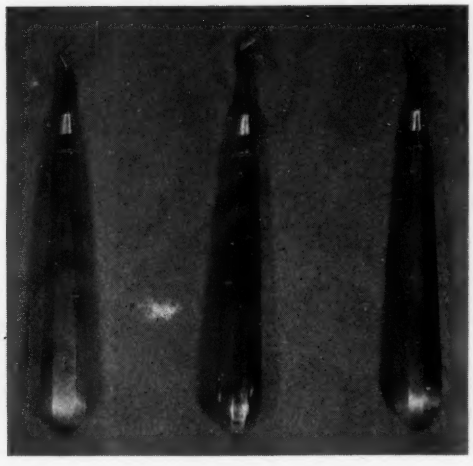

Fig. 15.

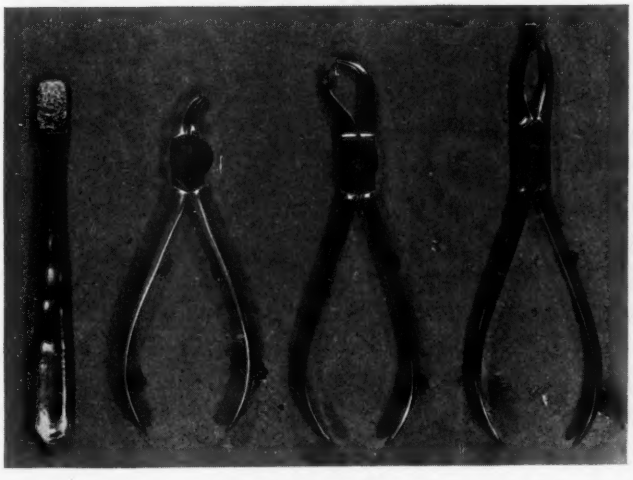

Fig. 16.

INSTRUMENTS

In order that an orthodontist may give material expression to the highest refinements of his art there must be coordination of the armamentarium

with the entire series of procedures that he is called upon to perform. The character of his work is often determined by this vital factor.

As a matter of review a few of the more important instruments used in molar band technic will be shown. In Fig. 13 is shown Peeso's band-forming pliers on the left and on the right a modification of these pliers known as Mershon's band-forming plier. These pliers are of great assistance in the process of contouring and fitting of the band.

The two pliers shown at the left in Fig. 14 are S. S. W. No. 114 and No. 112, and are both used in contouring of the band. The instrument at the extreme right is one purchased from an optical company and is used especially for bending band lengths into circular form preparatory to soldering. An end view of this plier will be shown in another slide.

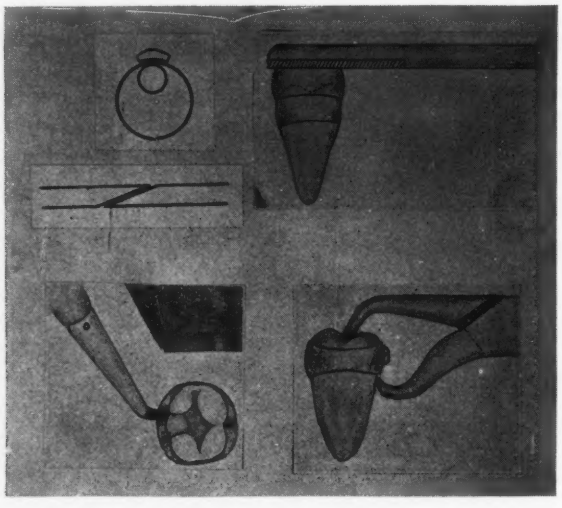

Fig. 17.—(Pullen.)

For fitting of the band at the occlusal and mesial and distal gingival margins the serrated burnishers shown in Fig. 15 are indispensable. The two at the left are J. Lowe Young's and at the extreme right is one designed by Dr. Mershon.

Starting at the left, in Fig. 16, is shown Case's band-removing plier which, with slight modifications in form of the cutting beak, can be most ideally used for removal of anterior bands. Next is Herbert A. Pullen's band-removing plier, a most practical instrument, next S. S. W. contouring plier No. 115. At the extreme right is Dr. Pullen's band-setting instrument. This is an all metal band-setter with a piece of pure tin soldered on the end to catch the edge of the molar band and prevent slipping. As this instrument can be readily sterilized it is much preferred by many operators over the hickory or orange wood stick.

In Fig. 17 is shown the application of Dr. Pullen's band setter and his band-removing plier. At the right is an end view of the plier shown in Fig. 14 for use in bending band lengths into circular form. At the bottom, on the right, is an illustration of the application of the serrated burnisher.

TECHNIC

There have been two distinct methods of making anchor bands for molars; the direct method, in which the bands are fitted directly to the anchor teeth in the mouth and the indirect method in which the bands are made on carefully constructed stone models of the teeth.

A compromise between these two methods is presented as follows: To quote from Herbert A. Pullen, "The band material is cut as shown in Fig. 18, into eleven different lengths for the various sizes of permanent molars found, ten of these varying each .02″ in length from 1.32″ to 1.50″ for either maxillary or mandibular molars. An especially long one is made 1.55″ in length for unusually large molars. The bands are usually made up in pairs of the same length, as the molars on each side of the mouth are identical in size. It will be found also that the circumference of each of the four first permanent molars is the same, again simplifying the construction of the bands through the uniformity of sizes of the bands, although the flare of the bands

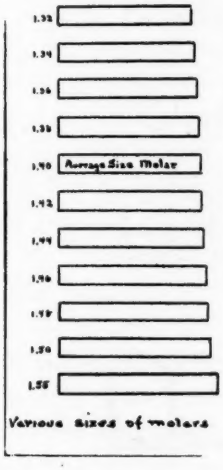


Fig. 18.—(Pullen.)

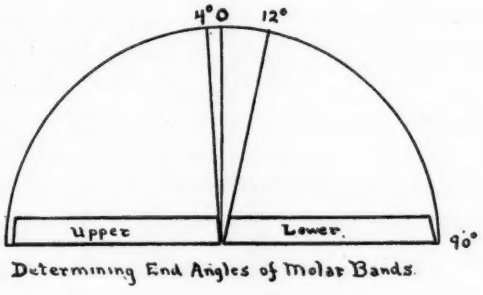


Fig. 19.—(Pullen.)

for mandibular molars is considerably greater than for maxillary molars, which is prepared for by cutting deeper end angles on the mandibular molar bands than on the maxillary. It is possible to make up maxillary and mandibular molar bands with predetermined end angles for the average molars as will be shown.

"The ends for these cut bands should be trimmed to definite angles (Fig. 19), for maxillary and mandibular molar bands, the maxillary bands being cut to a 4° angle and the mandibular bands to a 12° angle, these angles giving the proper flare to the finished bands for the average molar teeth, both maxillary and mandibular."

For daily use the scale of graduated lengths of band material may be made up on a metal die, said die to include the proper end angles.

The ends of each length of band material are next beveled so that when lapped, the joint will be a smooth one, and partially invisible. After soldering, the size of the band thus made, is scratched on the inside in order to avoid confusion in case the band is mislaid. The series in pairs of either

maxillary or mandibular bands from 1.32″ to 1.55″ may now be placed in small consecutively adjacent compartments in a suitable container, from which they may be selected to fit the various sizes of molars.

Accurate impressions having been taken of all the teeth of the arch in which the anchor teeth are located, and a suitable model of artificial stone made therefrom, we proceed to prepare the anchor teeth for banding.

The teeth to be banded (Fig. 20) are then isolated from the other teeth on the model by the use of fine saws, two parallel cuts being made both to the mesial and the distal and the intervening material removed, so that the anchor teeth are left intact but a space created on each side. With a sharp-pointed pencil, the junction of the gingiva with the tooth is marked so that this relationship may be kept in mind during the making and fitting of the band. Sharp chisels are then used and the portion of the model about the tooth corresponding to the soft tissues and immediate alveolar bone is

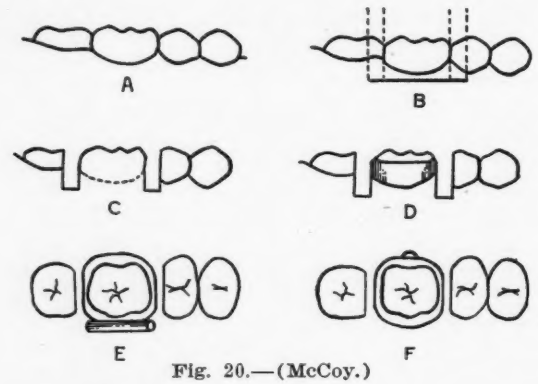


Fig. 20.—(McCoy.)

Fig. 21.—(Dewey.)

trimmed away, allowing the full crown portion and part of the root portion to be exposed.

The proper size band is now selected for the prepared tooth. A little experience will enable one to determine the proper size almost at a glance.

There is some difference of opinion relative to what part of the tooth the joint of the band should be placed. It is the practice of the writer to place the joint, on both upper and lower molars, at a point just mesial to the buccal groove. This allows of good adaptation of the band to the buccal grooves and leaves the lingual side of the band free for the attachments necessary.

It is very important that we trim the gingival edge of the band where it passes through the interproximal space. If one is using the direct method it is all the more important that the band be festooned before it is fitted to the tooth in order to avoid injury to the soft tissues. It is true that festooning of the band should not be carried so far as to make the grip on the tooth ineffective, but a little trimming will allow the band to be placed higher

buccally and lingually which, in turn, will leave the band sufficiently clear of the occlusal edge to do away with much of the wear and tear incident to mastication.

Fig. 21 shows a band which has been properly festooned and one which has not. It will be seen that when the band is properly festooned it can be carried down under the free margin of the gum on both the buccal and lingual without irritation to the interproximal tissue. On the other hand, without festooning, the band is either forced into the tissues or a wide margin is left between the gingival edge of the band and the gingival margin of the tooth.

The buccal and lingual sides of the tooth afford the greatest possible attachment of the cement and the band should be fitted as closely as possible not only because of this fact but because of the possibility of caries or decalcification when these two surfaces are not completely covered by the fitted band.

In adapting a band to a tooth, either by the direct or indirect method it should be kept in mind that the *circumference* of a molar tooth at the marginal ridge or contact point is practically the same as at the gingival margin, though of different shape. As before stated, the widest diameter at the contact point is mesiodistally, while at the gingival margin it is widest buccolingually. So in passing a band over the tooth, *the band spreads mesiodistally in going over the contact portion, but as it is pressed down over the tooth it spreads buccolingually and draws in mesiodistally and is thus accommodated to the tooth form at the gingival.*

With the band setter, contouring instruments and serrated burnishers the band is contoured, stretched and accurately fitted to the tooth.

At this point the operator may, if he wishes, try the fitted band on the tooth in the mouth before proceeding with the construction of the appliance.

In removing molar bands from the teeth anatomical form and convenience are factors to be considered. *Bands on mandibular molars should be removed from the buccal side, and on maxillary molars from the lingual side of the tooth.*

When it is possible to do so, the deciduous second molars should be used for anchorage in patients from six to nine years of age.

Since the anatomical forms of deciduous molars and permanent molars vary somewhat the technic should be modified in fitting a band to a deciduous molar. The gingival ridge on a deciduous molar is nearly straight which will leave the gingival edge of a band practically straight. The prominent elevation of enamel at the neck of this tooth makes it impractical to fit the band below the gingival border on any side of the tooth.

## CONCLUSION

To sum up briefly the more important points brought forth in this paper, it may be stated:

1. That the widest diameter of a permanent first molar, at the contact point, is mesiodistally, while at the gingival margin it is widest buccolingually, and that the diameter, almost without exception, is greater bucco-

lingually than mesiodistally. Due to the form of the tooth, however, the circumference at the marginal ridge or contact point is practically the same as at the gingival margin, though of different shape.

2. That in regard to the mandibular second deciduous molar, the occlusal circumference at the point encircled by a plain band exceeds the gingival circumference by at least four one-hundredths of an inch.

3. That with respect to materials it may be said, that a band that is easily formed is almost invariably equally easily unformed and that the stiffer materials are, therefore, to be preferred.

4. That we should give more attention to the selection of the proper widths and gauges of band material.

5. That heat treating and tempering have an important bearing on the physical properties of materials.

6. That bands on mandibular molars should be removed from the buccal side and on maxillary molars from the lingual side of the tooth.

7. That orthodontic bands must constitute the very foundation of the fixed orthodontic appliance and their proper construction is dependent upon our knowledge of the forms of molar teeth; upon the standard and quality of the materials used, and the degree of coordination of the armamentarium with the entire series of procedures necessary to their construction.

8. That the indirect method of making these bands, over stone models, saves time and labor to the operator, without sacrifice of efficiency, and without subjecting the patient to the wear and tear incident to measuring and fitting of the band in the mouth.

## DISCUSSION

*Dr. John R. McCoy, Los Angeles.*—We owe the essayist our thanks for this very fine paper. It is one of the most comprehensive and complete presentations of the subject that has come to my notice. I am one of those great believers in the indirect method of molar band making. Dr. Stryker has mentioned most of the more important reasons for that method. To my mind, one of the greatest reasons for this method is that it does not subject the patient to the pain and inconvenience which the direct method requires. Our little patients would not be suffering from malocclusion if they were perfectly normal physically. Why then, if we can make as good bands by the indirect method (and I think we can make them even better) should we subject them to this unnecessary inconvenience or pain?

Dr. Stryker rather hesitated to give us what he called a lot of dry material. It seems dry to him because he has read it over many times probably, but if we are to make bands successfully by the indirect method we will have to refresh our minds on dental anatomy a good many times, as he who tries to make molar bands by the indirect method without a knowledge of the anatomy of the teeth will fail. There has been quite a little discussion with regard to the matter of softness and hardness of band materials. Possibly, some of you have used a hard band material which is springy, as I have. When it is of a certain degree of hardness, you are not able to work it, you cannot burnish it, and you must festoon it mesiodistally in such a way that you may get into trouble, as it will not as a rule conform to the tooth, and springs back into its concentric form. So, I believe there is a happy medium between the soft and the hard material. We should be very grateful to those manufacturers who have put themselves out to make tests on band materials, as Dr. Stryker says, "They have done quite a little for the metallurgy of orthodontia." Dr. Stryker's details are quite complete, so that it would be useless for me to go further into them as it would simply take up your valuable time.

There is one thing that it was necessary for me to learn from sad experience and Dr. Stryker has also brought it out. I speak of the fact that occusal edges of molar bands should be relieved from occlusal stress. Unless you can do this, there will be trouble. The force of occlusion from an opposing jaw is tremendous, and if you allow occlusal stress on any part of your band, the material spreads and the cement soon disintegrates, and you may have a serious etching of the enamel. Had I learned this earlier in my practice, I would have saved many an enamel surface and myself much worry.

*Dr. Howard Dunn, San Francisco.*—Dr. Stryker has adhered so closely to facts and has gone into such detail in his paper that one hesitates to discuss it.

One should endeavor to select materials and construct bands that the most efficiency may be obtained, for if one is constantly recementing bands at the expense of time that should be devoted to treatment a great amount of time and energy is wasted.

The selection of materials and instruments is one which must be left to the discretion of the operator, for in my opinion no two operators work alike.

Regarding the selection of these materials it is impossible to conceive of using a material as rigid and as stiff as iridioplatinum, particularly if the band is to extend under the free margin of the gum. I do not believe that this material can be burnished nor contoured sufficiently to allow of close adaption. I am forced to feel that a softer material is more ideal.

To make our selection of material from those which show the greatest tensile strength may be proper to a degree, however there are a number of noble metal alloys which may not measure up to those enumerated by the essayist which no doubt are as valuable, for they will stand the strain placed upon them by the operator as well as the forces of occlusion and mastication.

Since having been assigned to discuss this paper I have conferred with a number of orthodontists and I find that a great number are in favor of the softer materials, such as coin gold or Ney Oro No. 2 .005-.17 with a possible 6 per cent platinum content. I have been using the coin gold band fitted by the direct method for some time and find that this material lends itself to a very close adaptation. These bands are seamless and are obtainable in sizes 13 to 18; however, the sizes mostly used are 15 and 16. They are .009, .008 and .007 in thickness. I use the .009.

In selecting one of this thickness, which is somewhat small for the tooth, I find that by the time I have stretched, contoured, ground and polished the band it has more nearly approached .007 in thickness and has taken on more rigidity, but will still permit of burnishing.

To take care of the end angle cuts of the soldered band, the seamless band is cut at the mesiobuccal, distobuccal, mesiolingual and distolingual line angles at the occlusal side of the band which permits of a close burnishing of the band. The excess is lapped at these corners and soldered.

Bands made from this material have been in place from one to two years before recementing was necessary and owing to the copper content have a lesser tendency to decay the approximating tooth than has an alloy containing platinum.

Bands should be carried under the free margin of the gum, especially where there are buccal attachments which cause a lodgment of food and consequent disintegration. Festooning bands does not weaken them, only in proportion as the width which remains on the proximal surface. It allows of more material to cover the buccal and lingual surfaces. It is difficult to see how anyone can advocate the use of bands that have a screw post and nut resting close to or upon the lingual tissues and furthermore advocate that these bands shall not be festooned.

*Dr. John R. McCoy.*—As to coin gold, I started using it nearly thirteen years ago and was one of its most enthusiastic advocates. I will say for it that the bands never become loosened from the teeth. However, I had some failures, and gave it up. Dr. Robert Dunn reminded me at one time that I had used material which was too thin, and I think he was right. However, I think we now have better materials of somewhat similar

quality, but of better color,—something which resulted from Dr. Bell's suggestions of last year. Mr. Wilkinson, of Los Angeles, made up the material, varying it a bit from Dr. Bell's formula—of gold, platinum, palladium, etc.

*Dr. W. J. Bell, Los Angeles.*—We are liable to overlook something. There is a mechanical side to the mounting of bands on molars. Dr. Stryker speaks of the bands snapping on. Dr. James McCoy took that up yesterday in his paper on the use of the open tube, where he spoke of the lips of the tube overlapping the wire. The reason it snaps is that the distance between the open portion of the tube is less than the diameter of the wire, and the closer you put these points together, the more the stress on the open tube. This also holds good in mounting molar bands. In the majority of cases the greatest circumference of the tooth is not at the free margin, and we cannot spring a band over a tooth, and then have the metal spring back again. Dr. Stryker spoke of the buccolingual diameter being greater than the mesiodistal diameter; but the circumference at the margin is not as great as it is at the occlusal surface. You cannot spring metal out, and expect it to go back like a rubber band. All that can be done is to get the band over the largest portion, so it will spring on as explained by him but do not extend it down so far as to injure the gum tissue, for therein lies failure and an improperly cemented band. As the band goes over the tooth the cement adheres to the band and the tooth. When you get below that point if it extends too far the band is bound to be farther from the crown than at the greatest circumference. Naturally that will act, as when you draw the plunger in on a syringe. It will be displaced and you will have a leak there.

There is one thing I cannot quite comprehend: Why use palladium and copper? The object of palladium is ductility and softness; the object of copper is hardness and springiness. So I do not see the need for combining the two.

*Dr. A. H. Suggett.*—The only measurement for a band is around the largest portion of the tooth,—the contact point. To carve down below the contact point is wasted effort. You may contour your band the best you know how and bunk yourself it will slip over the largest diameter and then contract to fit a smaller one.

*Dr. Stryker.*—Is that the largest circumference?

*Dr. Suggett.*—Yes.

*Dr. Stryker.*—According to Black it is not.

*Dr. Suggett.*—You can get your measurement with the plaster model. You can burnish the band on a stone model, but is it not better to burnish it in the mouth?

*Dr. C. C. Mann, Seattle, Washington.*—I dislike to take issue with a man who is as prominent in the profession as you (Dr. Suggett) are, but I do not agree with you at all. If I did I would not have prepared a clinic for this meeting. I cut the model on down further than you indicate. I take my measurement, cut the band, and contend that it is a matter of the personal equation. After contouring it, I draw it up around the tooth for a final fitting. Bands can be made on plaster models as well as on stone, but it seems to me the essayist has given us a world of wonderful data, and brought old things home to us, as well as offering many new suggestions.

*Dr. Leland E. Carter, San Francisco.*—I enjoyed Dr. Stryker's discussion, but differ with him in my technic, especially as to the material of the model. I use Mellotte's metal instead of plaster for a model. If there is any objection to that I should like to have it brought out here. I do less cutting than has been mentioned. I take fine strips of separating material, namely matrix material, and put it between the teeth and take a plaster impression of the molar with those strips in place. When I take out the impression the strips are embedded in the plaster. Then by taking moldine and isolating the molar from the other teeth and pouring the Mellotte's metal I have a reproduction of the molar in a metal on which I can work without danger of fracturing it. It is not necessary to trim it interproximally. I trim buccally and lingually slightly below the free margin of the gum.

*Dr. A. A. Solley, San Francisco.*—Have you ever noticed in the use of coin gold, or that containing platinum whether you are more apt to get disintegration of tooth struc-

ture in approximating contact point? It seems to me we are more apt to get it where the bands contain platinum than in the band of coin gold.

*Dr. E. C. Read, Long Beach, California.*—Dr. Dewey has made a hobby of base metal to avoid disintegration, claiming it has an action similar to copper cement. I know the bands become loosened more frequently, and that gives opportunity for examining the teeth oftener. It seems to me we might incorporate copper cement with the cement used under bands, rather than to try to get it in the composition of the band material.

*Dr. Solley.*—I mean the trouble appears in the approximating molar or premolar.

*Dr. McCoy.*—I do not think any of the copper is given off. The coin gold can be subjected to a high polish, and that may account for the fact that it is rather clean, but it is bunk about the copper being given off. If you want a copper cement Fleck's red copper is wonderful.

*Dr. J. W. Bell.*—We may lose sight of the finer points of metallurgy involved in band materials. It is not a chemical mixture. From the standpoint of atoms it is as clear material as ever, and under the microscope you will see a globule of silver, gold, etc. as it originally was. In reference to copper or any base metal in the band material; the liquid in our cement is a glacial phosphoric acid (metaphosphoric acid, some one says). The radical is in the cement proper, and the base is in the liquid. Normally any element in the nascent state will displace any other element. In setting the band, the cement being in a nascent state, will attack the band material, if there is any base metal used and the cement will not be hard but granular and chalk-like and will give way and allow leakage.

*Dr. T. R. Sweet, Oakland.*—I used a band material composed of 90 per cent platinum and 10 per cent iridium for a number of years. I have also used Ney Oro No. 2, and have noticed no difference in decay of approximating teeth. Dr. McCoy spoke of the red copper cement. I had some grief with it in the staining of the enamel, and I imagined it was rather dangerous to put it on a tooth with moisture present.

*Dr. A. E. Scott.*—It has been my observation and experience that practically every case of disintegration has been due to loose bands, to food or the contents of the mouth being forced between the band and the tooth. So far as the gold and copper is concerned I do not think there is much scientific data back of it. Inlays contain gold and copper. I have seen inlays which have been in place from fifteen to twenty years, and the teeth do not decay. I think the trouble is due to poor fitting bands or lack of proper cementation.

*Dr. E. C. Read, Long Beach.*—We are perhaps more frequently inclined to mix copper in cement where the surface has already started to disintegrate, for instance on the buccal aspect of the tooth. If the enamel has been already attacked we may get a discoloration, but is this not better than to have disintegration continue?

*Dr. John R. McCoy.*—It is better to have a little staining than to have a rough surface, which might be damaged during the wearing of a band placed with a zinc cement. The manufacturer of Fleck's cement is Mr. Stanley, whose son practices orthodontia in New York, and for this reason, I have felt that the manufacturer has had some good orthodontic advice. During the American Dental Association meeting in Los Angeles, I told the Fleck's cement representative that I had some trouble with his cement in staining enamel surface and he refused to believe it. I explained that it was only where the enamel was roughened or partially disintegrated. However, I feel that we should not object seriously to the staining in these cases if at the same time the tooth is being preserved.

*Dr. T. R. Sweet.*—I used red copper cement for some time and got quite a bit of staining with it. I tried to determine why it sometimes occurred. I am positive I did get staining where there was no disintegration in the enamel. If you do not get powder enough in your liquid you will get staining, or if any amount of moisture comes in contact with the cement while it is setting you may get staining.

I also observed a line of stain along the gingival in cases where the band did not go under the free margin of the gum.

*Dr. C. M. McCauley, Los Angeles.*—I do not believe we will be troubled with caries under bands in any case where the cement remains intact. The enamel of the tooth will

not decay unless those things which cause the formation of the decalcifying chemicals are allowed to lie on the surface of the enamel and as long as the band remains hermetically sealed to the tooth there is no chance for these materials to effect an entrance there, to make possible the formation of these chemicals. In the selection of a cement we should be governed not by the antiseptic qualities of the cement, as any cement will prevent the decay of the tooth if it is kept under the band. The first quality to consider is insolubility. A very desirable quality for a cement is that it will stick, or has adhesive powers, but our bands should be so fitted that great adhesiveness may not be needed. If you want adhesiveness you want glacial phosphoric acid. The cement that keeps out decalcifying chemicals must be one which has no glacial phosphoric acid, as that chemical causes pores in the cement which allows it to dissolve more easily. One of the things we should consider carefully in cementing bands is the technic of mixing our cement. We have copper cements that may have no advantages over those that do not stain the teeth, unless they may be less soluble. If you get a zinc cement with a liquid not containing glacial phosphoric acid you have one as good as the copper cement in the matter of solubility. The main thing we can gain in the manipulation of cement is to handle it in the way that will permit of the least amount of solubility and provide sufficient strength to hold the bands. As important as cement is to us it might not be out of order for somebody to give us something on the subject at our next meeting.

*Dr. A. E. Scott.*—Those of us who used German silver found it stained teeth to a marked degree and I should like to know why.

*Dr. W. J. Bell, Los Angeles.*—German silver is composed in great part of tin and copper. Tin in connection with copper sometimes forms a compound very easily. Naturally you will find the whole thing reverts to careful technic if you want to prevent decay under bands. Many of us do not take the care we should in preparing the tooth for cementation of the band. Cement will not stick to a wet surface. It will conform, but there is no adhesion there. Another thing: Every tooth is covered with a protecting film, or plaques which should be removed. With pyorrhea strips I polish the approximal surfaces of the teeth to be banded. If the tissues bleed I use adrenalin chloride to stop the bleeding. As Dr. McCauley has said, it is not so much the cement that is important as the technic with which we apply it. If we were more careful in the preparation and not in such a hurry we would have better results. If the child is tired do what you can and postpone the operation until another time. Put your bands on right and you will have very little staining or decay. The dark colored cements are the least insoluble. The more white they are the more soluble they are.

*Dr. Stryker.*—I thoroughly appreciate the thoughtful consideration you have given this paper. It has seemed to me that the greatest reward for our efforts can be obtained by selecting some important phase of orthodontia, upon which we feel that we need more detailed information, and either write a paper or give a clinic on the subject.

As time will not permit taking up the discussion in detail I will speak on only one or two points. Banding materials must be reasonably stiff and resilient to be practical. It was stated in the discussion that, as far as the end-results are concerned, it is a matter of how we do it, the technic, and not the materials we use.

To a certain extent that is doubtless true, but on the other hand a foundation, no matter how expertly constructed, is strong or weak according to the materials entering into its construction.

The question of cementing the band to the tooth is important. There seems to be nothing gained in using a so-called germicidal cement. It is more important to have a properly fitted band and at the time of cementing of the band to have the tooth thoroughly clean and absolutely dry. Needless to say we need the cooperation of the assistant at this point to successfully obtain the desired result. It is good practice for one to remove these bands at least every six months, thoroughly clean the teeth, and recement the band.

I thank you again for the opportunity and privilege of presenting this paper.

# AN APPLIANCE FOR ELEVATING IMPACTED MOLARS, PREMOLARS AND CANINES*

By Elizabeth E. Richardson, D.D.S., San Francisco, Calif.

THIS appliance consists of a band or crown to fit an impacted deciduous molar which was made from a measurement obtained from the deciduous molar on the opposite side. Half-round tubes were soldered on the buccal

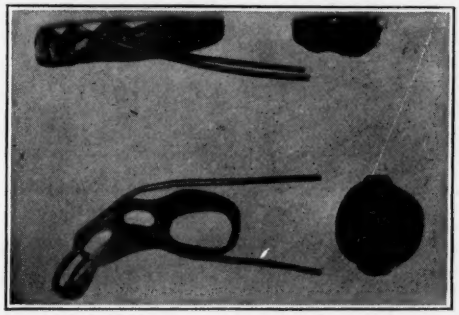

Fig. 1.—Appliance for elevating molars and premolars.

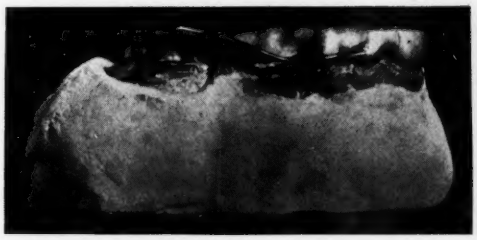

Fig. 2.—Appliance to elevate deciduous molars on model.

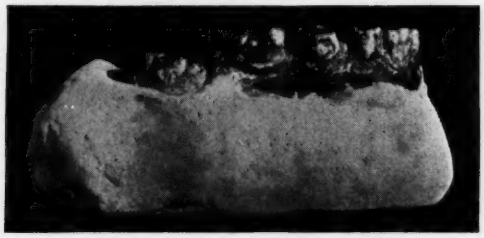

Fig. 3.—Model without appliance.

Fig. 4.—Model showing premolar in infraversion.

Fig. 5.—Appliance used to treat case shown in Fig. 4.

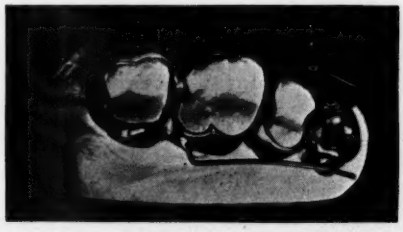

Fig. 6.—Occlusal view of case shown in Fig. 5.

and lingual surface of the crown. A cast crib was made on the first deciduous molar canine and incisors, of clasp gold (Fig. 1) care being taken not to allow the crib to cover the occlusal surface. Wires were soldered to the buccal

**Fig. 7.—Model showing case of an impacted permanent canine, and a peg-shaped lateral with a deciduous canine in place.**

**Fig. 8.—Occlusal view of Fig. 7.**

**Fig. 9.—Radiogram of canine of case shown in Fig. 8.**

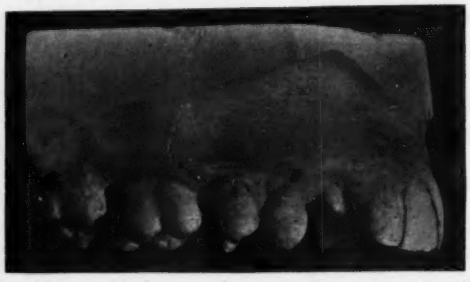

**Fig. 10.—Model showing canine exposed with porcelain jacket crown on lateral in place.**

and lingual surface of the crib (this wire was ney oro "E" spring wire 20 g.). After removing the gum tissue over the impacted molar, the crown and crib were cemented in place, the free ends of the spring wires on the crib were

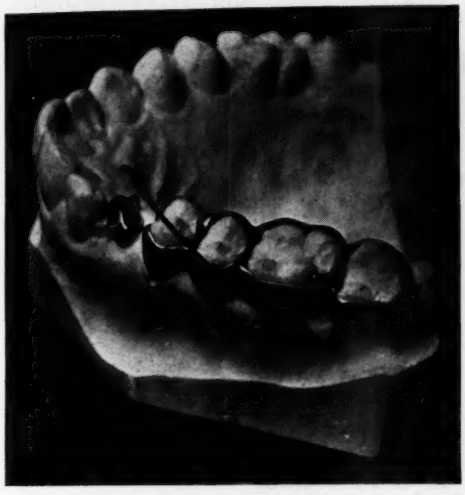

Fig. 11.—Appliance used in Fig. 10 to elevate canine.

Fig. 12.—Radiogram of canine after treatment with appliance shown in Fig. 11.

sprung beneath the half-round tubes on the deciduous molar crown which exerted an occlusal force on the deciduous molar, causing it to erupt.

The same appliance can be used for canines where pins have been cemented in the impacted canines and ligated to the spring wire on the crib.

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## CASE REPORT*

By Raymond J. Wenker, B.S., D.D.S., M.D., Milwaukee, Wis.

I BEG to make a preliminary report of a case of unusual mandibular prognathism in a patient twenty-three years of age.

*Family History.*—Parents, three brothers and three sisters all free from pronounced facial distortions or marked malocclusions.

*Personal History.*—Patient, L. W., age twenty-three, the third member of the family, breast fed and no digestive trouble, had a very severe attack of measles at the age of five, and infection of the tonsils and lymphoid tissue of epipharynx, probably in early childhood. The tonsils and lymphoid tissue were in this condition upon examination. The beginning of the development of the prognathism was not observed by the parents until after the age of fourteen years.

The jaw relation is one of extreme mesioclusion. The buccal cusp of the maxillary second premolar on each side occludes in the occlusal sulcus of the mandibular second molar with the mesial surface of the former about on a line with the latter. The maxillary lateral incisors were in lingual ver-

*Read before the American Society of Orthodontists, April 9-11, 1923, Chicago, Ill.

sion and were extracted at the age of fifteen. The maxillary arch, especially the anterior, is narrow and in general outline is that of a "V." In the mandibular arch the teeth from canine to third molar form a straight line on each side with the mandibular incisors in strong lingual version and in a straight row from canine to canine.

The excursion of the mandible is nearly normal. Palpation of the internal pterygoid and masseter muscles when tense indicates that the former is better developed than the latter.

Using the Lisher measuring apparatus the following measurements were taken:

Ear Radii

| | |
|---|---|
| To Chin | 13 mm. |
| " Labio-mental sulcus | 30 mm. |
| " Vermilion line (lower) | 32 mm. |
| " Mandibular incisal edge | 45 mm. |
| " Maxillary " " | 56 mm. |
| " Vermilion line (upper) | 43 mm. |
| " Base of nose | 46 mm. |
| " Tip of nose | 30 mm. |
| " Bridge of nose | 47 mm. |
| " Frontal ridge | 43 mm. |
| " Hair line | 13 mm. |

The distance from angle to angle taken on buccal aspect was 92 mm. Comparison with 13 like measurements of dry mandibles and two living subjects, shows the following:

| | |
|---|---|
| One, 85.7 mm. | Four, 98.4 mm. |
| Two, 88.9 mm. | One, 107.9 mm. |
| Two, 92. mm. | Two, 114.3 mm. |
| Two, 95.25 mm. | Two, 117.4 mm. |

Dr. F. A. Thompson, a skillful internist, has made a general physical examination of the patient and reports that there is no evidence of acromegalia or other abnormality.

I purpose to resect a portion of the mandible back of the first molar on each side, resecting a modified triangular shaped piece on each side with one point thereof pointing downward and one side upward. By this means I expect to reduce the prognathism and increase the angle of the jaw. It is planned to bring the teeth of the mandible into mesial relation with the uppers because the upper lateral incisors are absent. The condyles are situated strongly to the anterior and rather high in the glenoid fossae. Realignment of the arches will also be necessary.

The preoperative treatment given thus far has been to remove the tonsils, adenoids and five molar teeth, some of which were diseased.

Before undertaking the partial resection of the mandible I propose, by orthodontic means, to so modify the alignment of the upper and lower teeth

as to establish a satisfactory occlusion when the mandible will have been brought into an anatomic relation with the maxillae.

The accompanying illustrations will give some conception of the extent of the deformity.

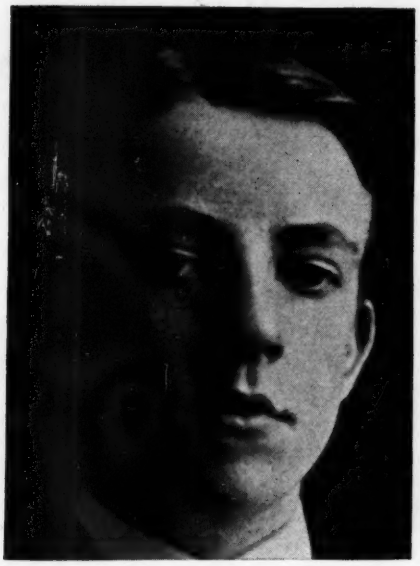

Fig. 1.

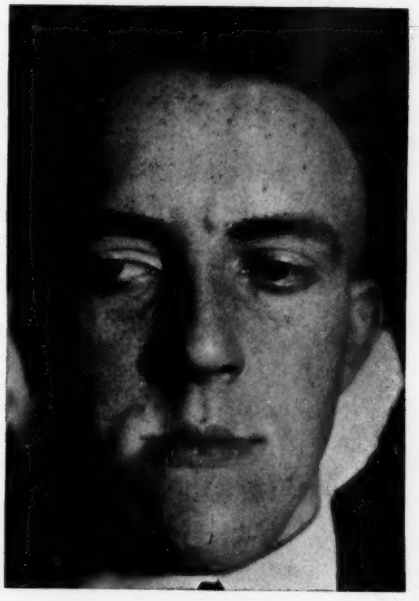

Fig. 2.

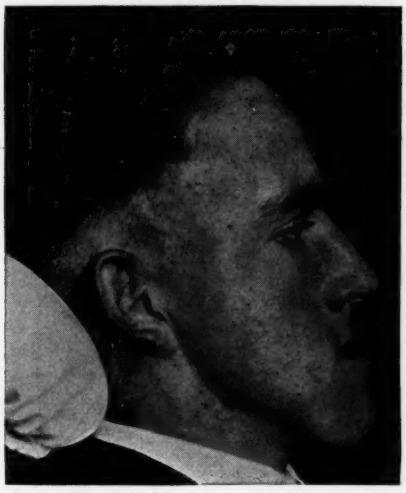

Fig. 3.

Fig. 4.

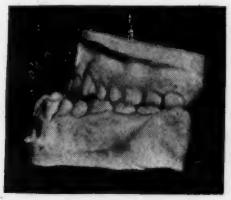

Fig. 5.

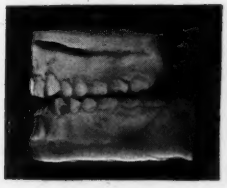

Fig. 6.

Fig. 1 shows the young man at the age of 14. This is an enlargement of a retouched small photograph taken by a professional photographer.

Fig. 2, photo, not retouched, taken at the age of 23.

Fig. 3, profile, not retouched, taken at the age of 23.

Fig. 4 shows occlusal view of the teeth. The lateral incisors were extracted several years before the patient consulted me.

Fig. 5, buccal view of the relation of the teeth. The cusp of the upper first premolar occupies about the same mesio-distal relation as is normally occupied by the mesio-buccal cusp of the upper first molar.

Fig. 7.

Fig. 8.

Fig. 6 shows buccal view of the proposed mesio-distal relation after the completion of the surgery with the exception that the teeth will be realigned so as to give a more satisfactory occlusion.

Fig. 7, plaster impression taken of face anterior to ears. Modeling compound has been moulded into the mandibular portion.

Fig. 8, modeling compound copy of mandibular portion of facial impression, showing imaginary outline of mandible with outline of proposed triangular resection marked thereon.

# RETENTION OF CLASS II AND CLASS III CASES*

By Dr. W. J. Bell, Los Angeles, Calif.

DURING my early practice, some thirty years ago, it was my lot to be associated with physicians and surgeons making splints for broken bones.

Some two years ago while making splints for broken jaws, the idea occurred to me to utilize what I now term an intermaxillary splint for maintaining the teeth in their corrected occlusion of Class II and III.

Fig. 1.

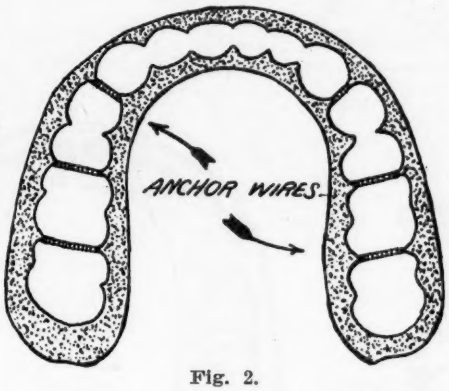


Fig. 2.

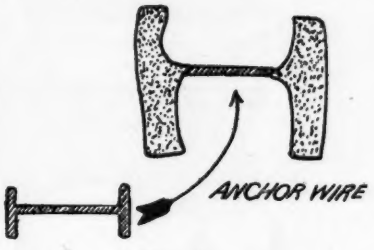


Fig. 3.

Fig. 4.

While this splint is not perfect its advantages greatly outnumber its disadvantages.

Like most removable retainers it is used on the teeth at night only.

It is a positive lock when in the mouth and prevents mouth-breathing.

*Read before the Pacific Coast Society of Orthodontists, San Francisco, Calif., February 18-19-20, 1924.

The construction is very simple and cheap and it is quickly made.

The form of construction may be varied according to the use required.

Fig. 7 shows a plain view of the intermaxillary splint.

Fig. 5 shows the splint inserted with a portion broken away for clearness of conception.

Fig. 6 is a cross section in the molar region.

Fig. 10 is a sectional view at the medium line.

In Fig. 1, a clearer view of the positive locking of the teeth in position.

Fig. 8 shows the labial wire placed on the teeth.

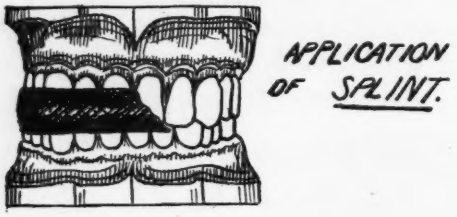


Fig. 5.

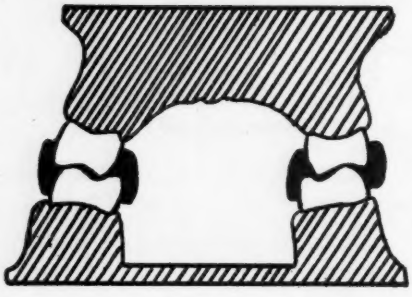

Fig. 6.

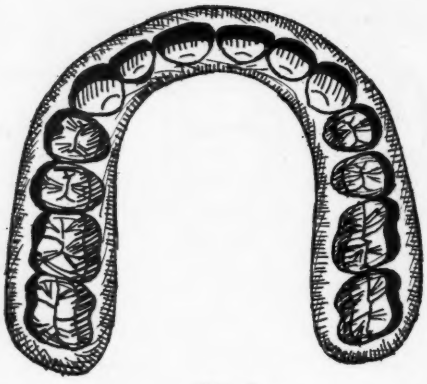

Fig. 7.

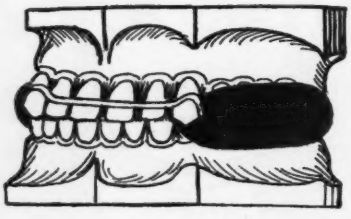

Fig. 8.

Fig. 9 shows the method of placing a labial wire for closing the spaces or changing the position of the anterior teeth.

Fig. 2 is the same as Fig. 7, except that the rubber between the teeth is cut away and the labial and lingual positions are held in place by wires which are vulcanized in the splint as indicated by the arrow.

By this arrangement the teeth are free for a better contact and normal adjustment.

Fig. 3 is a cross section of Fig. 2.

Fig. 4 shows a head band which may be used at night to prevent mouth-breathing.

If the following instructions are carried out the construction of the splint is accurate and simple.

Mould a ridge of modeling compound on the inner surface of tray (Fig. 11). Take a mush bite. Instruct the patient to hold the teeth firmly together and with the tongue press the compound against the lingual surface of the teeth.

Remove when thoroughly hardened.

Pour and articulate in the usual manner, using a good hard model plaster.

Place the required amount of yellow impression wax between the teeth of the model and take a second mush bite. Trim to the shape and thickness desired.

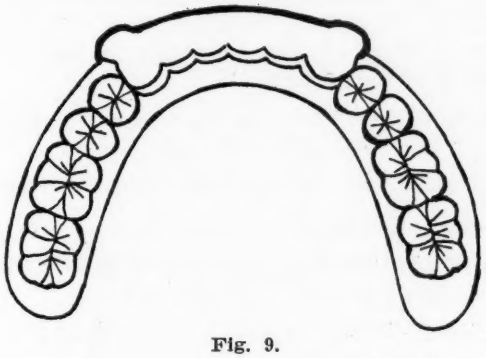

Fig. 9.

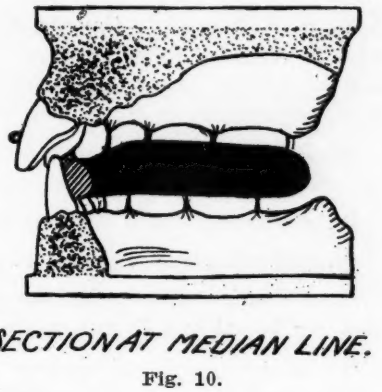


Fig. 10.

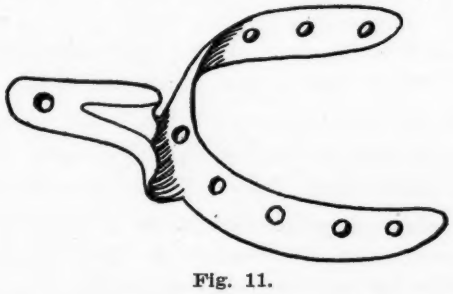

Fig. 11.

Remove the model from the articulator, flask, pack with rubber and vulcanize.

I have many of these intermaxillary splints in practical use and they are giving entire satisfaction.

While the word splint is a term usually applied to a form used to hold broken bones in place, its application to the maxilla and mandible is similarly applied until the functional activity is normally and completely established.

## DISCUSSION

*Dr. John E. Taylor, Hollywood, Calif.*—I am keenly interested in the subject of retention for several reasons: First, it represents that most important stage of orthodontic treatment, viz: "the last fourth." It reminds me of the old Biblical question, "What doth it profit a man if he gain the whole world and lose his own soul?"

Second, it seems to me that the retention period more nearly represents the period where physiology begins and mechanics cease. In our present state of orthodontic develop-

ment, it seems that some form of artificial retention is unfortunately necessary. Most of us at this time are unable to discard the mechanical feature of retention, but I am convinced that the best retainer is the one which allows the maximum amount of freedom for the normal functioning of the teeth and the surrounding musculature.

Whether it is the first or last stage of orthodontic treatment, normal function should be the keynote and the object of our endeavor. The retaining appliance which Dr. Bell has shown us is a positive lock, allowing no functional freedom whatever. It is not only a positive lock to the teeth but to the muscles as well. Abnormal muscular development is always associated with Class II and Class III cases. Now, I ask you if the rigid holding of those muscles in one position and at one tension, does not discourage rather than encourage their development?

Dr. Bell has had many years of experience and I value his judgment highly. He says it has proved satisfactory in his practice and it should be equally satisfactory in yours and mine.

*Dr. E. R. Schroeder, Alameda, Calif.*—Dr. Bell's appliance should be positive and most effective in retaining rotated teeth. I am wondering as to the possibilities of trouble from contraction of the rubber in vulcanization over a model. Is there any way to take care of that contraction? Does Dr. Bell use tin foil over the model?

*Dr. Bell.*—I vulcanize right over the models and have never had an appliance that did not go properly to place.

*Dr. Schroeder.*—Have you any preference where you cut away the occlusal surface?

*Dr. Bell.*—The only object is to allow a more complete occlusion.

*Dr. Schroeder.*—Where the plate is cut away you substitute these wires to get strength to hold the buccal and lingual portions of the plate together?

*Dr. Bell.*— That is only in case of there being difficulty in closing the teeth in a corrected case including all of the teeth. In some cases the premolars are the last teeth to come in place, and you do not want to keep the bands there for months in order to bring down the premolars to occlusion. There you would make the splint and cut away the rubber to give freedom to those teeth to make a more correct occlusion.

*Dr. Schroeder.*—Does the appliance ever have to be forced to place?

*Dr. Bell.*—It is a great deal like Dr. McCoy's open tube. You will be surprised how they snap in place and are held there. Only a few cases require the use of the head band.

*Dr. Schroeder.*—In using this vulcanite retainer, I think we should consider the acid action that might take place under the vulcanite at night, and I think we might use milk of magnesia as a precaution, or use some alkaline preparation.

*Dr. Bell.*—That would hold good equally well for the Hawley Retainer.

*Dr. Gray.*—Does Dr. Bell use this appliance immediately after bringing the teeth to proper occlusion?

*Dr. Bell.*—I try to place them in use within twenty-four hours after the removal of bands.

*Dr. Thos. Sweet.*—Do you use any other form of retainer? The patient wears nothing during the day?

*Dr. Bell.*—Nothing.

*Dr. W. R. Dinham, Portland.*—In distoclusion cases, where a correction has been made, but the lips are still shortened and out of function, I think the use of this sort of a splint, with the head band, might be splendid for overcoming mouth-breathing at night, which is essential for permanency of result. It would absolutely prevent mouth-breathing.

*Dr. Bell.*—I do not want to give the impression that I am putting something forward which is intended to displace every other kind of retainer. It is simply a means of retaining those stubborn Class II and Class III cases with their Divisions and Subdivisions. We all know how difficult they are.

# *DEPARTMENT OF*
# *ORAL SURGERY AND SURGICAL ORTHODONTIA*



## SOME ACCIDENTS AND COMPLICATIONS IN EXODONTIA

By William Ersner, D.D.S., Philadelphia, Pa.*

IT is a fact that the extraction of teeth is probably more frequently attended to by the general practitioner than any other minor operation about the mouth. In most instances, it is accomplished successfully, but it is the occasional accident that warrants us to be cautious and to take extraction more seriously. These accidents we must try to avoid, and we should take all precautions against them.

### BROKEN ROOTS

Probably the most common accident in exodontia is the breaking of roots. The black sheep of the family is the lingual root of the maxillary first premolar. The mandibular premolars are also frequent offenders, as well as the apices of the molars. In the attempt to remove the roots or apices of the maxillary premolars and molars, the manipulation of the forceps or elevators may force the root or apex into the antrum. If a root is forced into the maxillary sinus, as a rule it happens so quickly that one does not know what has occurred. However, there may be various predisposing causes, i.e., infection of the antrum having thinned down the floor making it less resistant, or the antrum dips down between the roots. It is therefore wise to be cautious, making a small gum flap, and with chisel or rongeurs remove some of the buccal alveolar plate and pick out the root.

### ROOT IN THE ANTRUM

If you find that the root has disappeared, or you have a faint suspicion that it is in the antrum, do not search around with your cotton pliers in the sinus or do any probing unless special surgical sterility is instituted. If you do, a septic sinus will result where an aseptic one existed before. To

*Assistant Visiting Oral Surgeon and Director of Dental Surgery, Philadelphia General Hospital.

prevent food from entering into the sinus place a small piece of iodoform gauze at the opening, but do not force it into the antrum. Call your patient's attention to the gauze, as it may slip into the antrum or it may be expectorated and thus cause excessive manipulation.

### FRACTURE OF THE TUBEROSITY

In the extraction of the maxillary third molars, care must be taken not to fracture the tuberosity. In case this does happen, you will notice a blanching of the gum in this area. Stop immediately, and with your lancet loosen the gum tissue and try to separate the tooth from the tuberosity by careful manipulation. Then carefully press the tuberosity back in position, as this condition is really a green-stick fracture and in the majority of cases union will take place with no further complications.

### ENGAGING THE TONGUE OR CHEEK WITH FORCEPS

Care should be taken in the extraction of teeth not to catch the tongue with the beaks of the forceps. It is very inconvenient to the patient, you have the possibility of a law suit, and let me add that not in all cases will the husband thank you for stopping the wagging tongue of his wife.

Care should be taken not to pinch the buccal mucosa with the joint of the forceps. This may prove more serious than one might anticipate. Here I might mention a case under my observation at the hospital. Three teeth were extracted from a patient with apparently no trouble. Five days later the patient was admitted to the hospital complaining of pain, and the face on the right side was considerably swollen.

The patient's temperature was 102°. He was referred to our service as suffering from a possible maxillary empyema. Upon examination we found no opening into the antrum, but noticed a lesion upon the inner mucosa of the cheek. The history of the patient showed that the cheek had been pinched with the forceps. The face was red, with palpation and pointing in several places. The temperature rose to 104°. The case was diagnosed as cellulitis of the face. Incision and drainage were established, but the patient developed septicemia and died.

### FILLINGS FALLING INTO SOCKET

In the extraction of teeth with large fillings, make sure that no part of the filling has fallen into the socket, as this may cause neuralgia, osteitis, the formation of sequestra, and other undesirable complications. Precautions should also be taken that no pieces of tartar remain in the socket.

### TARTAR IN FLOOR OF MOUTH

After extraction it is best to make sure that no pieces of dislodged tartar remain in the floor of the mouth, as occasionally one of these pieces may occlude one of the salivary ducts giving rise to a chain of unpleasant symptoms and complications.

### BROKEN NEEDLES

A much dreaded and common accident in local anesthesia is the broken needle. A needle becoming embedded under the periosteum or in the deep muscular fascia is not a simple matter and not so easily removed. This accident may be attributed to faulty technic of the operator, the use of too much pressure on the syringe, not watching the deviation from the angle at which the injection is made, allowing the needle to bend and break off, the use of the thin needle. We should use at least a 22-gauge needle. In the insertion of the needle, the patient's head should be steadied. In administering this type of anesthesia it is not advisable to use the swivel type of headrest which moves and thus may cause the needle to snap. A rusted needle should never be used.

### TRISMUS

This condition is caused by the injection of the anesthesia into muscular tissue. This complication can easily be avoided by the use of proper technic.

### PROLONGED ANESTHESIA

This condition is caused by residual alcohol remaining in the syringe from the sterilizing solution, or by injuring a nerve trunk with the needle while making the injection, or by injury to the nerve during operation.

### TEETH OR PUS IN LARYNX OR LUNGS

In the extraction of teeth, either with a general or a local anesthesia, or in the incising of abscesses, it is advisable to pack the throat with a gauze sponge tied with tape. This in no way interferes with the work of the operation. It will take care of the hemorrhage and also prevent the teeth from slipping down the larynx, and most important of all, prevent the aspiration of pus with the possible formation of lung abscesses. Therefore, when extraction is completed, and any portion of the tooth is missing, we should satisfy ourselves that the missing object is not in the bronchi. Quick action, if a foreign body has journeyed into the bronchus, is important. If the object is coughed up or removed early, there is no mortality, but when allowed to remain and be neglected, an abscess will form.

The symptoms and signs are, of course, choking and not having found tooth after operation. The common signs are cough, profuse expectoration, pain in the chest, hemoptysis and dyspnea. The x-ray will help, but if the x-ray is not conclusive, bronchoscopy should be performed by a skilled operator. In the presence of a foreign body in the bronchi there is only one treatment—bronchoscopy.

In conclusion, it is the little things that make life worth while, but not the little accidents.

# A CLINICAL REPORT REGARDING A CASE OF OSTEOMA INVOLVING THE MAXILLA*

By M. N. Federspiel, M.D., Milwaukee, Wisconsin

A CIRCUMSCRIBED mass of bone usually protruding from the anatomic outline of any osseous structure which is not inflammable may be defined as an osteoma. If, however, the projecting mass of bony substance should be of inflammatory origin, it may be defined as an osteophyte. Small bony tumors projecting from the surface of bones are usually called exostosis. The structure of an osteoma is usually spongy, although sometimes it develops into a mass of sclerotic hard bone. The difference between these forms

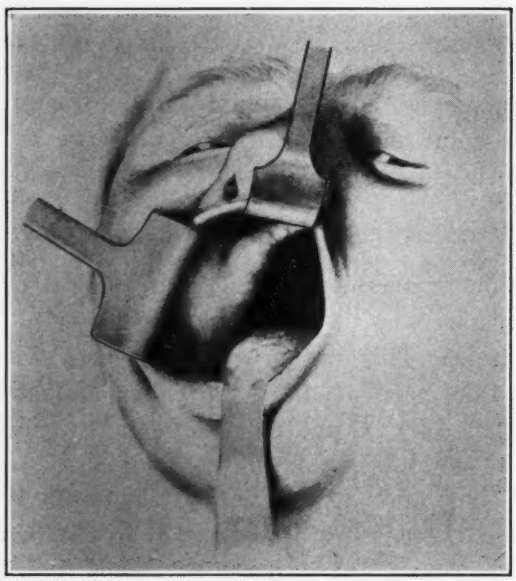

Fig. 1.

is in the varying number and size of the vascular and medullary spaces which they contain. These tumors are benign, and are usually found to be singular rather than multiple. The growth is extremely slow and not painful. When the mass becomes so large that it interferes with function and also causes a disfigurement, the patient then seeks the advice of a physician to obtain relief.

A very interesting case reported at our clinic for observation and care. The patient was a married woman, forty years of age, well nourished, and free from any physical ailment. About twenty-five years ago she had all her teeth removed and wore an artificial denture for a few years. She then noticed a slow, gradual, enlargement of the right maxillary alveolar

*Read before the American Society of Orthodontists, Kansas City, Mo., March 18-21, 1924.

ridge. The growth continued to enlarge so that she was unable to wear her false teeth. Upon examination we found that the mass was about 55 mm. in length and 25 mm. in width. It was hard and not painful to the patient. (See Fig. 1.)

When the antrum was examined, it was found to be normal; and the growth did not extend into the cavity. We came to the conclusion that this was an osteoma. The patient was operated on and the mass removed. (See

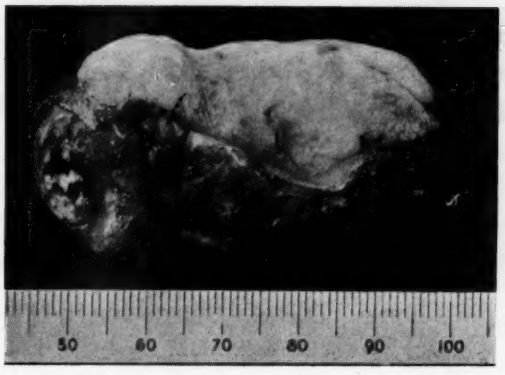


Fig. 2.

Fig. 2.) The patient recovered rapidly and was able to wear an artificial denture two weeks later.

Histologic study fails, as a rule, to distinguish simple hyperplastic growth of bone from true osteomata. Both processes yield dense lamellated bone with a few Haversian canals, or spongy bone with many vessels and abundant marrow spaces and cells. The gross and clinical features seem to form the best criteria by which to separate osteomata from simple hyperostosis.

Spontaneous or traumatic but noninflammatory origin, progressive course, circumscribed form, and active participation of osteoblasts are features which are most prominent in cases of osteoma.

# *DEPARTMENT OF*
# *DENTAL AND ORAL RADIOGRAPHY*

**Edited By**
**Clarence O. Simpson, M.D., D.D.S., F.A.C.D.,**
**and Howard R. Raper, D.D.S., F.A.C.D.**

## CHRONIC OSTEOMYELITIS AS A FACTOR IN FOCAL INFECTION OF DENTAL ORIGIN*

By C. W. Lokey, D.D.S., Birmingham, Alabama

WE are so in the habit of thinking of infection of the teeth in the terms of large areas of radioparent shadows at the apices of nonvital teeth that we overlook other diagnostic points of equal importance. It is the object of this paper to call your attention to some of the troubles that arise from a chronic infection of the bone and alveolar process in the mouths of patients who come under our observation for examination. A reason for a great deal of the unbelief in focal infection and its effect on other organs of the body, I feel sure is due to failure on our part, in a great many instances, to be as thorough in our diagnosis as we should be, for I cannot help but believe that if these patients were handled in a thorough and rational manner there would be no cause for dissension either in the medical or dental profession. Drs. Meisser and Brock in the American Dental Journal of December, 1923, reporting on a series of patients treated for chronic arthritis, state that only six of twenty-eight patients previously treated had been referred to dentists and in none of these had all the infected teeth been removed. Whether this is the fault of the patients or the dentists I cannot say but I fear that we must bear our share of the blame.

The first requisite as an aid and only an aid in diagnosis is a good set of radiograms of the mouth. The number of films should be limited only by the requirements of each case and should be rarely ever less than fourteen or sixteen. Each exposure should so overlap the other that when completed you will have each tooth showing on two films, each giving a different angle, and in unusual cases it is often necessary to make several exposures at as many different angles. The technic of making the radiogram should be very definite in order that all pictures should be uniform and give the best in detail. The purpose of the radiogram is to get a picture that will

*Read before The American Society of Dental Radiographers at Chicago, January, 1924.

show to the best advantage the different structures of teeth, bone and gum. Pictures that are overexposed burn out the detail of the less dense structure while those that are too light fail to show the more dense material. The best picture is a gray such as is recommended by McCormack. There are a great many areas of infection lying concealed under apparently healthy gums. These foci of infection are the result of granulation tissue and osteomyelitis being left, following the extraction of teeth with chronic abscesses or pyorrhea, and I have had the scrapings of a number of these areas examined by Dr. Graham, pathologist, and found them to be chronic osteomyelitis and granulation tissue, usually giving pure streptococci growth on brain broth.

These areas are also found around and between teeth badly infected with pyorrhea and it reminds us of the fact that Dr. Hartsell told us a number of years ago that pyorrhea was a chronic osteomyelitis. This osteomyelitic bone shows radiolucent in the radiogram; the corticle plate is sometimes found to be rough and jagged, while in other cases it will apparently be normal, the diseased area being confined to the cellular part of the bone. There is a disorganization of the bone cells, the trabicula being obliterated or broken down in small particles. Sometimes irritation has caused calcareous material to be deposited in the mass, these particles measuring from two to three millimeters. The removal of these areas is often very vexing as is the diagnosis, for in a great many of these cases there is no distinct dividing line and it is difficult to tell when you have thoroughly eradicated these diseased areas. These osteomyelitic areas often lie under the antrum and it is not unusual to find the floor of the antrum involved. The floor sometimes is covered with polypi or hypertrophied mucous membrane; it is also not unusual to find large areas of this diseased bone in mouths entirely edentulous, with patients wearing plates. In some cases the cortical plate is found to be soft, a dark color and perforated. It is not unusual to get a decided reaction following operations of these areas. This is possibly due to the change in the oxygen tension. These areas are sometimes manifest in a local neuralgia, a rising temperature, rheumatism, neuritis and other symptoms such as fatigue malaise, and lack of energy such as you find in chronic infection. These areas, however, very seldom cause local pain and while some are sore to pressure they usually require radiograms to locate them. The majority of these cases are negative to the customary sinus picture. Even the dental picture in a great many cases is very difficult to interpret and I am convinced that there are a large number of patients suffering from infections of the antrum in which the radiogram and clinical findings are so obscure that no positive diagnosis can be arrived at. I have some slides that will illustrate, in a measure, some interesting cases—patients mentioned in the paper. All these people were seen in consultation with medical men. At this time I might say that in most of the patients there had been a careful, thorough study of the general physical condition, in many there had been differential blood counts, and in all except three or four there had been negative blood and Wassermann tests; in no case was a positive Wassermann reaction found. Some of these illustrate the unusual form of antral disease which has lately

attracted much attention; namely, the extension of disease through the alveolar process pushing up the mucous membrane, the periosteal lining of the floor of the antrum. Dr. W. G. Harrison reported details of these cases in May, 1922, at the Washington meeting of the American Laryngological, Rhinological and Otological Society. In some of these cases there had been a collection of pus under this tent-like periosteal membrane. In others there was a slight perforation of the periosteal lining with the presence of polypi and pus in the true antral cavity.

Case 1.—Mrs. K. B. See Fig. 1, *A* and *B*. Chief Cause of Complaint: *General fatigue with muscular soreness in arms and thighs.* Tonsils have been

Fig. 1*A*.

Fig. 1*B*.

removed and patient feels that she is definitely better, but has never been completely relieved and within the last few weeks symptoms seem to be increasing. General examination fails to reveal any cause for the discomfort. A clinical examination of the teeth was negative. However, a careful re-reading of the radiograms revealed a chronic osteomyelitic condition under the anterior buccal floor of the antrum. This area was thoroughly curetted with the idea of removing every vestige of possible infection. After the lapse of three years the patient remains perfectly well with no suggestion of a return of former symptoms.

Case 2.—Mrs. J. H. W. See Fig. 2, *A* and *B*. Chief Cause of Complaint: *Excessive muscular fatigue.* For four years the patient has had periods of

excessive muscular fatigue; worse in the morning. Is much distressed by recurring mouth breathing, which began in the last three years.

Radiographic findings of teeth, negative, with the exception of broken-off right maxillary first molar root. On removing this root, an abscess was found extending into the antrum with quite a free discharge of pus. After thorough drainage, patient apparently recovered. After having a relapse, the mouth was re-radiographed and a careful examination of the films showed a suspicion of osteomyelitis of bone under left antrum. On curetting this area, it was found that the cavity extended through the floor of the antrum, but the mucous membrane lining the antrum was intact. The case was under obser-

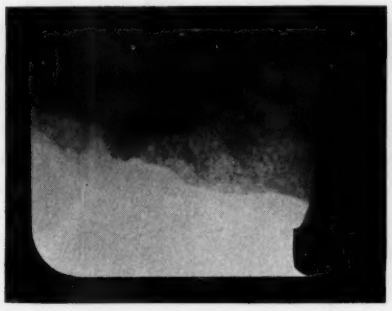

Fig. 2*A*.

Fig. 2*B*.

vation with the rhinologist, and we agreed that it might be wise to irrigate each antrum in the hope of finding a focus of pus. Irrigation was negative. The patient made marked improvement, but relapsed in three or four months, and at this visit, for the first time complained of some pain in the face. Antral irrigations were negative, and for the first time the antra appeared more or less hazy. The rhinologist advised exploratory opening of each canine fossa, and in each side the mucous membrane was elevated above the floor by a collection of pus lying on the osteal floor of the antrum. There was a small perforation of the mucous membrane on the left side where the antral cavity proper contained a number of polypi. On the right side the antral cavity proper was normal, excepting the presence of a fluctuating mass between the mucous membrane and the osteal wall of the floor. This was punctured and 2 c.c. of pus removed. The entire mucous membrane from the

floor was then removed and a small area of necrosis, 2 mm. in diameter, led into a necrotic area of the right alveolar margin. This was thoroughly curetted, and since these radical procedures, there has been no return of symptoms.

CASE 3.—Mrs. C. L. See Fig. 3. Chief Cause of Complaint: *Pain in the muscles of the neck and shoulders.* This patient had formerly suffered rheumatic (?) pains in various parts of the body from which she got marked relief by the removal of her tonsils. Two years subsequently she suffered more or less with rheumatic pains in the back on several occasions, and had seemed to be perfectly relieved each time by proper attention to pyorrhea

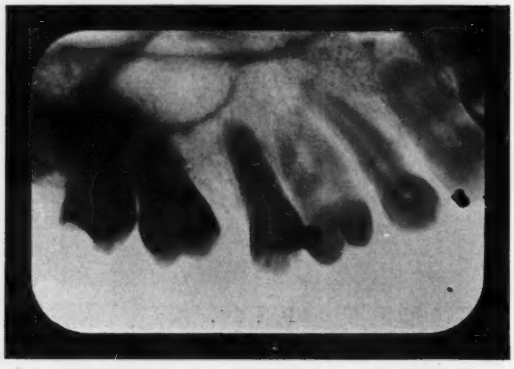

Fig. 3.

Fig. 4*A*.

Fig. 4*B*.

pockets. This time a most careful search failed to reveal any sign of infection, but a small area of the alveolar process on the right side looked abnormal. After turning back the flap this area was carefully curetted. A culture showed streptococci. The area did not extend to the antral floor and the patient has remained perfectly well.

CASE 4.—Miss M. G. See Fig. 4. Chief Cause of Complaint: *Recurring headache with some afternoon temperature—99° to 102°.* Patient complained of headache with some afternoon temperature off and on for four years. Glasses have been changed several times and patient had undergone a series of careful examinations by internists and rhinologists. Several white blood counts covering a period of two years have shown a leucocytosis of between 8,000 and 12,000 with an increase of the lymphocytes. She had

several negative irrigations of each antrum and many negative radiograms of the head and sinuses. She had spent six months in the mountains for relief of a suspected tuberculosis, though no definite diagnosis was ever made. Influenced largely by the surprising results from three previous experiences of turning up a flap and curetting a suspicious alveolar process, it was finally decided to repeat the investigation on this patient. On each side the patient had lost two maxillary teeth, and there was a rather suspicious area (nothing by any means definite) suggesting a rarefaction of the bone about the floor of each antrum. In each instance we found small necrotic areas much resembling the necrosis in old mastoid disease. In each instance the necrosis extended up into the antrum but did not perforate the mucous membrane of the floor—the mucous membrane having been elevated from the bony floor very much as the operator elevates the mucous membrane from a deflected septum. Owing to extensive necrosis, it was thought wise to have a radical antrum operation and this was done on each side. After a lapse of three years there has been no return of fever from which the patient had suffered at least ten days out of every month for the preceding two years. The blood counts have been normal, and there has been almost complete relief from the former headaches.

Fig. 5.

Case 5.—Mrs. E. C. C. Chief Cause of Complaint: *Pain in region of right ethmoid. Suspected focal infection.* Patient had suffered for several months with ureteral stricture and was referred to the rhinologist to find a possible focus of infection. Tonsils were bad and were removed. The patient complained greatly of a pain in the region of the right ethmoid. Radiograms were negative. The nose was free of any signs of disease. The antrum was irrigated. No pus was found, but the pain entirely disappeared for several days. So marked was the relief from the irrigation that the patient returned to have it repeated every week or ten days until the antrum had been irrigated five or six times. At no time was there the slightest suggestion of pus. After this baffling experience, she was sent to me by Dr. Harrison with the request that I search for some suspicious area about the alveolar process. The general clinical examination of the teeth was negative, but the radiogram of the right maxillary alveolar process showed a

rarefied area suggesting the possibility of osteomyelitis, as had been found in several of the other cases. This was thoroughly curetted. A culture showed streptococci. The patient obtained perfect relief and after two years has had no return of symptoms.

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# THE TECHNIC OF ORAL RADIOGRAPHY

By Dr. Clarence O. Simpson, St. Louis, Mo.

## DANGERS AND PROTECTION

*(Continued from page 586)*

IN the decade following the discovery of x-rays there was a gruesome harvest of burns resulting from indiscriminate and unrestricted exposure to the radiation. The responsibility for this may be placed on the physicists of that period, especially Professor Roentgen who discovered the rays but was inconceivably negligent in not fully testing their physical properties. A few simple experiments on animals would have served as a precious warning of the injurious action of the rays. The crude apparatus was a contributory factor in many serious burns, since without means to determine the quality of the rays the operator's hand was used as a penetrometer and with inefficient tubes, subjects were often exposed to dangerously soft rays.

With modern radiographic equipment it is generally believed and stated that there is no danger incident to its use, but on the contrary the danger is greater than ever before because of the more powerful apparatus. Comparative safety is secured only by restricting exposure to safe limits, utilizing the protective measures indicated, and employing constant vigilance in operating. Safety rests upon the knowledge and care of the operator, and not in any type of apparatus which generates x-rays.

*Electric Shock.*—The principal dangers in the operation of radiographic equipment are of two kinds, electric shock or burn from the high voltage current and exposure to radiation. From time to time a death occurs from shock by x-ray apparatus, although the current used for radiography which rarely exceeds 65000 volts or 35 milliamperes is not inherently a fatal current. Age (either very young or elderly), organic disease, reduced vitality, favorable conducting conditions, prolonged contact and the route of the current through the body contribute to serious results from electric shock. Since these factors cannot be controlled, rigid precautions must be maintained to avoid accidental shock.

The operating chair should not be "grounded" either intentionally as is sometimes done, or unintentionally by the attachment of a fountain cuspidor or contact with heating, gas, or water pipes. All high voltage wires and connections should be kept a distance of twice the back-up from the patient and other persons present, and the high voltage switch should not be closed without the path of the current being under the observation of the operator. A foot switch increases the risk of shock through the possibility of someone thoughtlessly or accidentally stepping upon it. An automatic circuit breaker reduces the danger of serious shock, but should not be depended upon as a substitute for other precautions.

Over-head installations should be amply secure to prevent any part falling while the current is passing through it. Tubular conductors supported by bracket insulators are much safer than wire aerials under tension. For protection of the operator all switches and controls should have insulated handles and be inclosed, and as a further precaution they should not be manipulated with damp hands or with both hands simultaneously. Crowded quarters and the proximity of other equipment favor accidents in the operation of radiographic apparatus, and if the space is available a room should be exclusively used for the examinations. The static which accumulates around high voltage apparatus is of no consequence except when contact with the tube stand causes the patient to move during an exposure. This may be prevented by a ground wire or chain on the tube stand, but avoiding contact with the patient is the easier and preferable method.

*X-Ray Burns.*—The danger of injurious exposure to the radiation should be seriously considered in the operation of x-ray machines. This danger exists in excessive exposure of patients during examination, and in the cumulative effect of repeated exposure on the operator and associates. To guard against an erythema dose in the radiographic examination of a patient, one must know and never exceed the limit of safe exposure. Although there is considerable variance in the estimates of an erythema dose under the conditions prevailing in radiography, 1800 milliampere seconds with a 4½ inch back-up and an 18 inch target film distance may be accepted as an average erythema dose. Since some subjects are more susceptible to radiation than others, it is inadvisable to apply more than two-thirds of the erythema dose or 1200 milliampere seconds.

In practical application no area of the face should receive more than 1200 milliampere seconds during an examination or within a period of two weeks, and the overlapping of adjacent regions must be considered in the calculation. With a cone three inches in diameter, two maxillary and two mandibular regions adjacent to each other will overlap in the area of their common juncture, so the total exposure of the four regions would be the skin dose in that location. The effect of exposure from the opposite side of the face is much reduced, and a total exposure of 3000 milliampere seconds may be distributed in a general radiodontic examination with an 18 inch target film distance (target skin distance ranging from 15 to 17 inches) and an average back-up of 4½ inches.

An important precaution before an extensive examination is to ascertain whether or not the patient has been recently exposed to radiation, and if so to what amount. This should be done without arousing fear, but is necessary because of the prevalence of inferior radiography which occasions repeated examinations. When there is a possibility of exceeding a safe limit of exposure, the examination should be deferred for two weeks.

The use of filters is a negligible factor compared to other precautions against harmful exposure in radiography. While a filter absorbs the softer rays, the exposure must be proportionally increased to compensate for it, and it may give a false impression of protection in exceeding a safe exposure. A thin filter is desirable to prevent the patient from seeing the lighted tube, and to protect the patient from particles of glass if the tube should be broken. For this purpose $\frac{1}{10}$ of a millimeter of aluminum is sufficient, and a filter thicker than $\frac{1}{2}$ a millimeter is contraindicated in oral radiography. Such extreme safety factors are indicated not only for the welfare of patients, but to guard against malicious damage and malpractice litigation.

*Protection of Operator.*—Rigid precautions are required for the protection of the operator and associates in the practice of radiography. The effect of repeated exposure is cumulative and insidious, so a procedure which insures ample protection should be established and maintained. With rare exceptions the film packets during exposure should not be retained by the operator or the assistant. The cone should not be directed toward the operator or assistant when the tube is in operation. The operator and assistant should stand at least four feet back of the tube in operation, and if an average of more than six exposures per day are made the operator should stand behind a protective screen or wall.

This precaution applies even though the tube is inclosed in lead glass, because secondary radiation occurs from the patient and all objects in the path of the rays, especially metal equipment. Wood or glass partitions offer no material resistance to the rays, so the cone should not be habitually directed toward associates without the protection of a tile wall. If there is doubt about the adequacy of protection, a test should be made by attaching a coin to a film packet placed in the questionable location facing the tube. After a month of routine operating, if the outline of the coin is not disclosed on the developed film the location is safe.

# *ABSTRACT OF CURRENT LITERATURE*

**Covering Such Subjects as**

**ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY**

**It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.**

**Cancer of the Mouth.** C. W. Hanford (Chicago). The American Journal of Physical Therapy, July, 1924, i, 4.

The author, who is a radium therapeutist, is favorably disposed to the use of radium in cancer of the mouth and lip, and has many encouraging results, although operating surgeons continue to be skeptical and seem oftentimes to prefer electrocautery, actual cautery and other semisurgical procedures, with or without the use of the knife. Dr. Hanford mentions electrocoagulation as an accessory to radium treatment in cancer of the inner aspect of the cheek and in general wherever there is a sloughing area to be destroyed. In cancer of the antrum he regularly uses diathermy, and regards this as preferable to the red hot soldering iron in opening up this cavity through the mouth. The use of deep x-raying is limited to the lymphnodes of the neck, etc., when these are involved in buccal cancer.

While no figures are given in substantiation, the author claims that in the large Chicago clinics where radium is being used the results from radium plus surgery are decidedly superior to the old figures of material in which surgery alone was used. We find the knife mentioned only in connection with extirpation of cervical lymphnodes known to be cancerous and therefore conclude that by "surgery" he refers to diathermy or the actual cautery.

The favorable influence of the radium-heat treatment is well seen in the great reduction in the degree of mutilation. No longer do we witness extirpations of the upper jaw for malignancy, extirpation of the entire tongue, large V-shaped incisions in the lower lip and extensive block dissection of the cervical lymphatics. This more than anything else appears to indicate a revolution in the treatment of malignancy of the mouth and lip.

**Healing of Extraction Wounds.** W. Meyer (Gottingen). Zeitschrift für Stomatologie, August, 1924, xxii, 8.

The author has investigated this subject in animals and his effort is the second of the kind ever made, the earliest having been by Euler in 1923. A third study will be published by Leimeister. Naturally both the normal and infected extraction wound is covered, or should be, and of the infected wound two subtypes are considered, according as infection preexisted or ensued

after extraction. While the subject is considered primarily from the histologic side there are some practical sidelights. The secondary infection of the extraction wound in man is readily recognized when the patient returns to the dentist complaining of severe pains in and about the tooth socket. In the more serious cases there is fever and disturbance of the general condition preceded by a chill. The pain increases instead of subsiding. The gum is swollen and reddened, the coagulum looks dirty and may be replaced by pus while bits of necrotic bone may be visible at the alveolus or interradicular septum. As a rule the breath is foul and the regional lymph nodes swollen and sensitive. There may be lockjaw and dysphagia. Large areas of bone may necrose as a result of the action of the bacteria of infection. The affection may pass over into a subacute or chronic stage with formation of a fistula. There is always liability of reinfection. Infection may preexist before extraction as a periodontitis and after extraction this may light up an infection of the thrombus. In order to prevent secondary infection the alveolus should be freed from all spiculae of bone and the alveolar margin and interradicular septum trimmed sufficiently for the gum and fibrin to project above the bone. For treatment the author emphasizes chlorphenol-camphor as having a remarkable influence against the pain, with dry heat applied externally. This preparation is also valuable as a prophylactic.

**Geology and Dentistry.** Liesegang (Frankfurt am Main). Zahnaerztliche Rundschau, August 10, 1924, xxxiii, 32.

Many thinking men must have wondered, since lime is so freely deposited in animal tissues in both normal and abnormal conditions, why so many tissues are immune to this deposition. In other words what is the nature of the protection of organism from a general calcification?

Recently one of Gysi's students, Miss Fuhrer, wrote a graduation thesis on the conservative deposit of lime in caries of the teeth, which serves to check the advance of this disease. This work has inspired the author to speculate on the intimate nature of calcium deposit and absorption. Another recent dissertation by Praeger also discusses the same problem under the name of mineralization and remineralization. We know that a certain alkalinity of medium is requisite and certain types of plastic cells are doubtless required. Several have sought in the behavior of calcium salts in the soil a possible analogy with the behavior of the same in tissues. A colloid medium seems necessary in both cases, and in both there is evidence of rhythmic action.

Study of coral reef formation also suggests an analogy with the deposit, absorption and redeposit of calcium which is nearer vertebrate life than the formation of limestone in the crust of the earth. Here, as in the vertebrate, we find an association of fluorine and calcium which makes for hardness.

It does not appear that these speculations have thus far led to anything definite, but it is evident that the study of calcium deposit should begin with purely inanimate nature and pass upward through coral formation to study of the solid tissues of the mollusks, crustaceans and vertebrates.

**An Early Symptom of Pernicious Anemia.** Pappendorf (Berlin). Zahnaerztliche Rundschau, July 20, 1924, xxxiii, 6.

In theory the dentist ought to possess much knowledge of the affections of the tongue, hard palate, etc., on account of their intimate association with the dental arches. But study of dental periodical literature, at least as far as America is concerned, shows little interest in the pathology of the tongue. In Europe, even in the strictly dental journals, to say nothing of those devoted to stomatology and oral surgery, more attention is paid to these lesions. The author calls attention of the dentists to certain alterations of the tongue which should enable the latter to foresee the onset of pernicious anemia. This condition is known by the term "Hunter's glossitis," although this is in reality a misnomer, for the condition is not inflammatory. There is a first stage of eruption of pinhead sized vesicles of greyish-white color, along with epithelial defects and fissures. Most striking are the subjective symptoms which comprise severe burning sensations which are rendered much worse at the time of taking food and especially by dry bread and pungent articles. The affection passes into a stage of atrophy during which the filiform papillae mostly disappear.

While this affection was first described by Möller in 1851, and although even at that period he associated it with a form of tapeworm as one cause of severe anemia, it was not until recently that it has been definitely connected with anemia without respect to the particular causal factor. In other words it is a definite symptom of the blood state and the dentist who encounters it or anything suggestive of it should at once refer his patient to a physician. Since the anatomic alterations are relatively insignificant, the dentist ought to be on the lookout especially for the "burning tongue" symptom.

**Malnutrition and Dental Defects.** L. F. Meier, Lincoln. The Pacific Dental Gazette (republished from the Dental Summary), August, 1924, xxxii, 8.

The author is able to corroborate Emerson in the claim that defective teeth do not stunt growth. Comparisons show that those with bad teeth grow normally or with such a slight difference in favor of those with good teeth as to be negligible. This negative evidence is of course no argument against preventive dentistry including dietetic resources. The "normal child with caries" is suffering from a deficiency disease and in a state of malnutrition. It is, of course, true that caries like rickets can be outlived or outgrown, which fact may partly explain why the adult can present marked caries with relative health. The fact that bad teeth cause rejection in armies is argument enough that the bearers are substandard men.

In taking up the subject of diet the author outlines the alkali-forming foods which oppose acidosis, the vitaminiferous foods and the food articles which contain the requisite mineral matter. Among striking types of food articles are cabbage, which contains alkali-formers, the three well-known vitamines and mineral matter; whole wheat bread, which contains all the mineral matter of the soil and the four known vitamines; citrus fruits, which despite low nutritive value contain relatively large amounts of alkali formers

and vitamines B and C; egg yolks, which contain alkali formers, calcium and phosphorus, iron and vitamine A; and raisins, which contain alkali formers, phosphorus and iron and vitamines A and B.

**The Story of the Toothbrush.** C. Edgar Thomas (London). The Dental Digest, August, 1924, xxx, 8.

The first introduction of the toothbrush is separated in time from the general adoption by many decades. Just when a toothbrush was first made and used will probably never be known and from analogy it is not unlikely that it was invented and reinvented more than once. It is a matter of record that it was on sale in Paris as early as 1649, was an ornate affair and had a case to keep it in. Before that date and as early as 1640 it was known to some of the court ladies of Europe and was very probably in general but restricted use in court circles. Mention of this fact is found in the memoirs of Sophia, Electress of Hanover, who mentions that as a child she was diverted by the grimaces made by a lady while brushing her teeth. The first mention of the article in English annals is in 1729, in which year Francis Sitwell records that he paid four pence for a toothbrush. Long before and for many years after these dates it is evident that persons of quality used cloths and sticks and toothpicks to cleanse the teeth, with the aid of toothpowders and lotions or simple water. It is not unlikely that the early toothbrush was a crude affair which shed its bristles easily, and as late as 1806 it is mentioned as defective in this respect. Nevertheless, strange to relate, it seems nowhere to have been abused by writers on the toilet, which is the usual fate of the newfangled article. It is enough to state that such men as Lord Chesterfield and Samuel Johnson do not seem to have known of its existence and the word does not even appear in the early editions of Webster's dictionary. Not until the edition of 1860 do we find it in the new appendix of that volume. Hence it is amply evident that over a century elapsed between the earliest recorded use of this article and its familiar use among ladies and gentlemen.

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# *EDITORIALS*

## Institutes and Bureaus

DURING the past few years there has been a tendency for the organization of institutes and bureaus in the medical and dental profession, supposedly for the purpose of rendering a superior service to the public. Up to the present time these organizations, in our minds, have failed to demonstrate their superiority, and we believe some of the most widely advertised institutions which are supposed to give out health information are misleading the public and in some cases cause more harm than good. We realize that an institute which is successful will undoubtedly be copied by men whose motives are "financial" rather than altruistic. They will not be permeated by a desire to render superior service, neither will they care to serve a certain class of people who cannot avail themselves of the superior knowledge

and service that can be derived from an intelligent general or special practitioner.

We do not say that all institutes or health bureaus are not living up to their standards of organization, but we do believe, from examples which have come to our notice, that in many instances misleading information is given out by these institutions or bureaus that will have a detrimental effect on the public and which often reacts upon the medical and dental profession as a whole.

As an example of this, we shall quote in full a diagnosis which was made at one of the health institutes. This institute has had wide publicity through journals and is quite well known to the public. After the patient was examined, the following report was mailed to him under date of July 1, 1924.

"Saliva examination reveals the fact that you do not have either sufficient quantity of saliva or the proper ingredients. To help you until such time as you make a decision, we would advise you to double the amount of water you are now drinking. Would also advise the increased attention to capacity breathing so as to more completely oxidize your blood. Your lung capacity is not sufficient for your body.

"The examination of your oral x-rays taken in 1919, the transillumination of your head and the history of your posterior teeth and your various angles of health, cause us to say that you undoubtedly have both antra infected. There is undoubtedly some residual infection in the superior maxillary bone.

"You undoubtedly have a hereditary lymph glandular insufficiency. To overcome this condition, you need the cooperation and the coordination of the scientific elimination of the vicious bacterial cycle which has overcome some of your internal glands.

"The probable expense of this would be between $400.00 and $500.00. It would require your daily presence at the Institute for at least six or seven hours each day for ten or fourteen days and occasional treatments running over a period of two weeks further.

"If we can be of further assistance to you, kindly let us know."

(Signed.)

You can very easily imagine the "nervous condition" of the patient after receiving a letter clothed in words that would confuse a learned medical practitioner. Conditions are cited which are not described in modern works on pathology. X-rays taken in 1919 as well as "transillumination of the head" and the "history of the posterior teeth" lead the institute to believe the patient is suffering from defective antra! In following up the work and diagnosis of this institute, we find that almost every patient who goes to it for examination, if examined by a certain individual, is informed that the maxillary antra are infected and operation will be necessary. It is rather a surprising thing that this institute is able to get evidence of infected maxillary sinuses, when other men of prominence in the profession are unable to so diagnose the condition. After perusing the third paragraph

relating to the "hereditary lymph glandular insufficiency" and the "co-operation and the coordination of the scientific elimination of the vicious bacterial cycle which has overcome some of your internal glands," we can readily imagine the horror and mental agony of the patient who is informed by men whom he believes to be learned that he is the victim of such things. In fact we should hate to be suffering from such ailments ourselves, although in reading the many works on pathology we are unable to understand exactly what was the matter with the patient and why the third paragraph was written. Undoubtedly, when a patient has so many things wrong with him as has been outlined in the above mentioned letter, the mild sum of four or five hundred dollars for treatment does not seem too much, regardless of the fact that we have no knowledge of what the treatment would be. However, from information which we have gained, the treatment would undoubtedly include the opening up of both maxillary sinuses and the irrigation of these cavities. After ten or fourteen days' time, undoubtedly, the maxillary sinuses would be pronounced cured of the vicious cooperation and the coordination of the bacterial cycle would be eliminated.

The patient upon receiving this diagnosis consults other men who are unable to find any such condition as the patient was supposed to be suffering from as outlined in the diagnosis of the institute. This patient has avoided the long treatment of ten or fourteen days which would take six or seven hours a day, but a great many other patients would unquestionably follow the advice given by the institute, because of their belief that it is everything that it claims to be.

That this is not an isolated case is proved by the fact that we have had two other instances referred to us in which dental examinations have been made by medical bureaus, and information given out which is absolutely misleading. One bureau, which is widely advertised and which contains the names of some international men on its stationery, is noted for making dental examinations of the teeth and giving advice on dental subjects. The radiographic examinations of the teeth are made by an M.D. who knows nothing about dentistry, and but little more about radiography. A case came to our attention of a dentist of international reputation, who at the suggestion of an insurance company had an examination by this bureau. After an examination by the radiographic department the "dental" (?) examiner informed him that he had some very bad crowns and bridges which would have to be removed. You can imagine the surprise of the dentist upon getting such information, owing to the fact that he did not have a crown or a bridge in his mouth. After calling the attention of the radiographer to the fact that he was mistaken, the man who makes the diagnosis for the bureau admitted that he knew nothing about dentistry and was simply employed as a technician. However, the public is unaware of these facts and if the information had been given to someone besides a dentist, he might have considered it as authentic and acted upon the advice of the diagnostician.

The same bureau made an examination of another patient who was wearing a regulating appliance consisting of two soldered lingual alignment wires

with bands on the molars. The diagnostician informed the orthodontic patient that the bridges were very poorly constructed and the teeth carrying crowns would have to be removed; also that the incisors showed a very bad pathologic condition. As a matter of fact there was no infection around the teeth whatsoever. The usual change which may be seen was that accomplishing the orthodontic tooth movement. The patient was very much alarmed over the work of the orthodontist, but after considerable difficulty we convinced him that nothing unusual was wrong and that the diagnostician did not know what an orthodontic appliance was and probably he did not know very much about dentistry.

These instances which we have cited undoubtedly are occurring over and over and very often the patient will take the advice of an institute or bureau in preference to the advice of the family physician or dentist.

We are willing to admit that an organization properly conducted by qualified men and utilizing proper equipment and scientific knowledge may be able to make a satisfactory diagnosis and possibly render a service to a patient which will be equal to that rendered by the family physician or dentist. However, from examples which we have cited, we believe that in a great many instances a bureau tries to get by upon a reputation rather than upon the service rendered. The salaries paid to assistants are so small that the services of competent men cannot be obtained, consequently medical diagnoses are given out which are just as misleading as the dental diagnoses.

We would sound a warning to the individual practitioner to be on the lookout for diagnoses made by institutes and bureaus, because certain patients seem to think they can get a superior service to that obtained from an individual practitioner. Until such a time as these medical and dental institutes and bureaus demonstrate their value to a greater extent than they have, we shall be inclined to believe the general practitioner is the most reliable source from which the public can get dependable information.

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## The Common Ancestor of Man and Apes*

DISCOVERY of three fossil jaws of a primitive creature that is believed to be an ancestor to both man and the apes has been made in the Siwalik Hills of India by Dr. Barnum Brown, scientist and explorer for the American Museum of Natural History. The first announcement of this important anthropologic event was made on April 14, by Dr. William K. Gregory, of the American Museum of Natural History, at a meeting of the New York Academy of Sciences at which many other evidences for human evolution were reported.

This common ancestor of human beings and chimpanzees and gorillas is called Dryopithecus. The specimens secured by Dr. Brown and sent to the museum for study are remarkable in that they show three different stages of the evolution of Dryopithecus and come from three successive periods of time or "horizons" as the geologist calls them. Each of the jaws lacks some

*Reprinted by permission from *Science*, April 25, 1924.

teeth, but they are sufficiently complete and well preserved to allow Dr. Gregory, the museum's expert on human and pre-human remains, to determine that Dryopithecus is a forerunner of man as well as the apes. Former finds of skeletons of Dryopithecus in Europe and Asia left in doubt the question as to whether this creature that lived in India during Miocene times, the middle of the great age of mammals, was actually pre-human.

Dr. Gregory found that the patterns of the crown surfaces of Dryopithecus' molar teeth are strikingly similar to the way in which the minute furrows and cracks on the surface of the enamels of human and modern ape teeth are now arranged.

Toothaches suffered by human beings today can be blamed largely on Dryopithecus, declared Dr. Milo Hellman, who has determined that we have inherited much of our susceptibility to dental decay from this common ancestor of man and apes. Studies of dental records show that the germs of human teeth decay, lodge most frequently in the cracks and furrows that correspond to and evolve from the pattern found on the molars of Dryopithecus. Modern apes have escaped from the ravages of tooth decay, because although they possess the same inviting cracks and furrows, they eat foods that do not allow decay to set in.

The fossil jaws of Dryopithecus were discovered by Dr. Brown as the result of explorations in the north of India, when the weather was so hot that collecting could be done only in the early morning.

In addition to announcing the discovery of Dryopithecus, Dr. Gregory called attention to the fact that Darwin's conclusion that man was an offshoot of the primitive ancestors of the anthropoid apes had been buried under an accumulation of details, but that a number of investigations now going on in New York had brought forward new evidence in support of Darwin's view.

Dr. Dudley J. Morton pointed out that many features in the foot of the adult gorilla approach conditions in the human foot. He showed how the continuation of the habit of living on the ground and using the feet in the way the gorilla now does might be expected to make it still more like man in the distant future. He concluded that the analysis of skeletons of man, monkeys and apes definitely supports Darwin's interpretation and discredits all other theories of man's origin.

Dr. J. H. McGregor summarized the multitudinous resemblances in the soft anatomy of man and anthropoid apes and concluded that the relationship was much closer than is ordinarily suspected. He referred especially to the close resemblances in the reproductive organs of the female gorilla and mankind.

Dr. Frederick Tilney exhibited the brains of a series of apes in comparison with a human brain and said his investigation showed that as we pass from the lowest primates or lemurs through monkeys to the great apes, the brain becomes more and more human until in the gorillas it is definitely more like man's than like the brains of the lowest primates. He exhibited

a series of cross sections showing the development of certain centers and nerve tracts associated with the use of the hands which become larger and more complicated as the hands are freed from the support of the body and as the bipedal posture becomes habitual.

Professor Henry Fairfield Osborn, president of the American Museum, said his researches on fossil mammals led him to conclude that the human line had been separated from the anthropoid line for an enormous period of time, stretching back perhaps to the lower oligocene or the second period of the age of mammals. He predicted that remote ancestors of man would be found in central Asia and that they would be large-brained erectly walking primates remotely related to the anthropoids.—*Science Service.*

# *ORTHODONTIC NEWS AND NOTES*

### American Society of Orthodontists

The Twenty-fourth Annual Meeting of the American Society of Orthodontists will be held in the new Atlanta-Biltmore Hotel, at Atlanta, Ga., April 14, 15, 16 and 17, 1925. (Mark off the date now.)

Walter H. Ellis, Sec'y-Treas.,
397 Delaware Avenue,
Buffalo, N. Y.

Clinton C. Howard, President,
Doctors Building,
Atlanta, Ga.

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### The American Society of Dental Radiographers

The annual meeting of the American Society of Dental Radiographers will be held at the Adolphus Hotel, Dallas, Texas, Friday and Saturday, November 7 and 8. All dentists interested in radiography are invited to attend.

Arnott A. Moore, President
131 Allen Avenue
Buffalo, N. Y.

Martin Dewey, Secretary
501 Fifth Ave.
New York, N. Y.

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### Dental Society of the State of New York

The Dental Society of the State of New York will hold the fifty-seventh annual meeting at the Hotel Ten Eyck, Albany, N. Y., May 13, 14, 15, 1925. All literary exercises, clinics and exhibits will be staged at the Hotel Ten Eyck.

The Society extends a cordial welcome to all ethical dentists.

Make reservations early at the Hotel Ten Eyck.

Exhibitors are requested to address Dr. E. W. Briggs, 1116 Madison Avenue, Albany, N. Y., for space.

A. P. Burkhart, Secretary,
57 East Genesee Street,
Auburn, N. Y.

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### Creighton Dental Alumni Association

The annual clinic and home coming of the Creighton Dental Alumni Association will be held in Omaha at the Creighton Dental College, October 23, 24 and 25, 1924. Dr. O. A. Runyon, President, 806 City National Bank Bldg., Omaha, Nebr.

### American Dental Association

The Sixty-sixth Session of the American Dental Association will be held at Dallas, Texas, November 10, 11, 12, 13 and 14, 1924.—Otto U. King, Secretary.

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### News and Notes

Dr. Charles S. Adelstein announces the removal of his office to Suite 830 Rose Building, Cleveland, Ohio. Practice limited to orthodontia.

Dr. G. M. Anderson announces the removal of his office to 833 Park Avenue, Baltimore, Md. Practice limited to orthodontia.

Dr. Fred R. Blumenthal announces the removal of his office to 475 Commonwealth Avenue, Boston, Mass.

Dr. Chilton E. Byington announces the removal of his offices to Suite 813-814 Provident Building, Chattanooga, Tenn. Practice limited to orthodontia.

Dr. A. LeRoy Johnson announces the removal of his office to 1530 Locust Street, Philadelphia, Pa. Practice limited to orthodontia.

Dr. W. W. Leslie wishes to announce that after October 1st his office will be located in the new Pacific-Southwest Bank Building, Room 1402, Fulton and Mariposa Streets, Fresno, Calif. Practice limited to orthodontia.

Dr. George B. Parker announces that he will conduct a practice of orthodontia at Suite 648-650 Woolworth Building, Watertown, N. Y.

Dr. Franklin A. Squires announces that after October 1st his practice will be limited to orthodontia exclusively. 20 Church Street, White Plains, N. Y.

Dr. Albert E. Voss announces the removal of his office from 725 Mack Building, Denver, Colo., where for the past three years he has been associated with Dr. A. H. Ketcham in the practice of orthodontia, to 909 Professional Building, 1052 West Sixth Street, Los Angeles, Calif. Practice limited to orthodontia.